Contents—Sept. 1943

Volume XXIV No. 9

ARCHIVES OF PHYSICAL THERAPY

30 North Michigan Avenue, Chicago 2, Illinois

Original contributions, exchanges and books for review should be forwarded to the Editorial Office. All business matters including advertising should be handled through the Executive Office, 30 N. Michigan Ave., Chicago 2, Illinois. The statements in the manuscripts published in the ARCHIVES OF PHYSICAL THERAPY, are made solely on the responsibility of the author. The American Congress of Physical Therapy does not assume any responsibility for statements contained therein. Manuscripts accepted for publication in ARCHIVES OF PHYSICAL THERAPY, are for exclusive publication and may not be published elsewhere.

OFFICERS

American Congress of Physical Therapy

FRED B. MOOR, M.D.,
Los Angeles, President.
KRISTIAN G. HANSSON, M.D.,
New York, N. Y., President-Elect.
MILAND E. KNAPP, M.D.,
Minneapolis, First Vice-President.
WALTER S. McCLELLAN, M.D.,
Saratoga Springs, N. Y.,
Second Vice-President.
*H. WORLEY KENDELL, M.D.,
Chicago, Third Vice-President.
*KENNETH PHILLIPS, M.D.,
Miami, Fla., Fourth Vice-President.
*O. LEONARD HUDDLESTON, M.D.,
Denver, Colorado, Fifth Vice-President.
RICHARD KOVÁCS, M.D.,
New York, N. Y., Secretary.
JOHN S. COULTER, M.D.,
Chicago, Treasurer.
WALTER J. ZEITER, M.D.,
Cleveland, Executive Director.
MARION G. SMITH, B.Sc.,
Chicago, Executive Secretary.

EXECUTIVE COUNCIL

A. R. Hollender, M.D., Chicago, *Chairman.*
*Norman E. Titus, M.D., New York, N. Y., *Secretary.*
William Bierman, M.D., New York, N. Y.
John S. Coulter, M.D., Chicago.
James C. Elsom, M.D., Madison, Wisconsin.
Frank H. Ewerhardt, M.D., St. Louis, Mo.
Roy W. Fouts, M.D., Omaha, Nebraska.
John Severy Hibben, M.D., Pasadena, Calif.
Disraeli Kobak, M.D., Chicago.
Frank H. Krusen, M.D., Rochester, Minnesota.
Nathan H. Polmer, M.D., New Orleans.
William H. Schmidt, M.D., Philadelphia.
Albert Frank Tyler, M.D., Omaha, Nebraska.
Frederick L. Wahrer, M.D., Marshalltown, Iowa.
Fred B. Moor, M.D., Los Angeles, Ex-Officio.

EDITOR EMERITUS

DISRAELI KOBAK, M.D.,
Chicago.

* In Active Service.

Subscription — In the United States, its possessions, and Mexico, $5.00 yearly; Canada, $5.50; elsewhere, $6.50 the year.
Advertising rates on application. All advertising copy subject to acceptance by publication committee.
Published monthly at Chicago, Illinois, by American Congress of Physical Therapy.
Entered as Second Class Matter, January 29, 1938, at the Post Office at Chicago, Illinois, under the Act of March 3, 1879.

ORIGINAL ARTICLES

Physical Medicine in the Isolated Military Dispensary
Lieutenant Edward W. Lowman (MC) 517

Foot Problems in Wartime ..... Henry H. Jordan, M.D. 524

Preliminary Report of Results Observed in Eighty Cases of Intractable Bronchial Asthma .....
G. P. Miley, M.D.; R. E. Seidel, M.D., and J. A. Christensen, M.D. 533
Discussed by Drs. G. J. P. Barger; Walter F. Simmonds and G. P. Miley.

Teaching of Physical Medicine in Relation to the War Effort .....
Frank Krusen, M.D., and Earl C. Elkins, M.D. 543

Artificial Fever Therapy in Brucellosis .....
Genevieve L. Joy, M.D., and Fred B. Moor, M.D. 557

•

Editorials 563

•

Medical News 565

•

Book Reviews 568

•

Physical Therapy Abstracts 570

•

EDITOR OF THE MONTH

WALTER M. SOLOMON, M.D.

Cleveland, Ohio

(On leave of absence, U. S. Army)

Printed in U. S. A

American Congress of Physical Therapy

Officers and Committees 1943

Officers

President
Fred B. Moor, M.D.
Los Angeles, California

President-Elect
Kristian G. Hansson, M.D.
New York

First Vice-President
Miland E. Knapp, M.D.
Minneapolis

Second Vice-President
Walter S. McClellan, M.D.
Saratoga Springs, N. Y.

Third Vice-President
* *H. Worley Kendell*, M.D.
Chicago

Fourth Vice-President
* *Kenneth Phillips*, M.D.
Miami, Fla.

Fifth Vice-President
* *O. Leonard Huddleston*, M.D.
Denver, Colo.

Secretary
Richard Kovács, M.D.
New York

Treasurer
John S. Coulter, M.D.
Chicago

Executive Director
Walter J. Zeiter, M.D.
Cleveland

Executive Secretary
Marion G. Smith, B.Sc.
Chicago

Section Officers

Eastern Section

Chairman — Isadore Levin, M.D.
Secretary — Madge C. L. McGuinness, M.D., 1211 Madison Avenue, New York, N. Y.

Mid-Western Section

Chairman — M. K. Newman, M.D.
Secretary — William D. Paul, M.D., 120 Golfview, Iowa City, Ia.

Southern Section

Chairman — Nathan H. Polmer, M.D.
Secretary — Robert L. Bennett, M.D., Georgia Warm Springs, Warm Springs, Ga.

Southeastern Section

Chairman — John J. McGuire, M.D.
Secretary — Emil J. C. Hildenbrand, M.D., 4201 Fessenden St., N. W., Washington, D. C.

Western Section

Chairman — Frances Baker, M.D.
Secretary — John Severy Hibben, M.D., 201 N. El Molino, Pasadena, Calif.

* In Active Service.
** Deceased July 9, 1943.

Advances in Education

Earl C. Elkins, M.D., *Chairman.*
Frances Baker, M.D.
Robert L. Bennett, M.D.
Catherine West, M.D.

Constitution and By-Laws

*Norman E. Titus, M.D., *Chairman.*
John S. Coulter, M.D.
Frank H. Ewerhardt, M.D.

Cooperation with Army, Navy, Public Health and Veterans Administration

John S. Coulter, M.D., *Chairman.*
*Charles R. Brooke, M.D.
*Norman E. Titus, M.D.

Finance Committee

Frank H. Krusen, M.D., *Chairman.*
Roy W. Fouts, M.D.
Frank H. Ewerhardt, M.D.

Legislation

*Edwin L. Libbert, M.D., *Chairman.*
Muriel Downer, M.D.
Milton G. Schmitt, M.D.

Medical Economics

Madge C. L. McGuinness, M.D., *Chairman.*
**David E. Jones, M.D.
William D. Paul, M.D.

Meeting Place

Walter J. Zeiter, M.D., *Chairman.*
Albert A. Martucci, M.D.
J. Wayne McFarland, M.D.
Frederick L. Wahrer, M.D.

Membership

Richard Kovács, M.D., *Chairman*
John S. Hibben, M.D.
Jessie Wright, M.D.
*Walter M. Solomon, M.D.

Nominating

Frank H. Krusen, M.D., *Chairman.*
Clarence W. Dail, M.D.
Charles O. Molander, M.D.
Bror S. Troedsson, M.D.
Nathan H. Polmer, M.D.

Problems Affecting Technicians

Nathan H. Polmer, M.D., *Chairman.*
William H. Northway, M.D.
Miland E. Knapp, M.D.

Public Relations

William H. Schmidt, M.D., *Chairman.*
*H. Worley Kendell, M.D.
K. G. Hansson, M.D.

Scientific Exhibits and Gold Key Awards

Miland E. Knapp, *Chairman.*
Disraeli Kobak, M.D.
G. J. P. Barger, M.D.
John S. Coulter, M.D.
*O. Leonard Huddleston, M.D.

PHYSICAL MEDICINE IN THE ISOLATED MILITARY DISPENSARY

LIEUTENANT EDWARD W. LOWMAN, (MC) *

UNITED STATES NAVY

In this paper I shall consider the practical value of physical medicine to the medical officer who may be isolated in any one of the thousands of small dispensaries now scattered to far-flung outposts around the globe — the medical officer who, because of the exigencies of the war, must function independently and who through brain and salesmanship must keep men fit for their duties. It is the simpler, common procedures naturally which are adaptable in such a setup; yet the judicious and proper application of these simpler procedures of physical medicine can be of inestimable value to the medical officer as an adjunct to medical and surgical procedures.

The basic functional cog in a military organization is, of course, the man; the maintenance of this cog in a state of maximal efficiency is the weighty and often perplexing responsibility of the medical officer. Too often the physician has a deficient appreciation of the value of physical measures. Unlike civilian practice, in a military medical department, where the rapidity of convalescence is of utmost importance, this deficiency is the more obvious. On the other hand, and more commonly, there is a nebulous appreciation together with a deficient technical knowledge. In civilian medicine, the latter is partially compensated for by intelligent nurses and technicians who have been instructed more or less in the simpler procedures; in the service there is rarely this compensatory link, and the medical officer's inadequacy may well become obvious. Glaring examples may be seen frequently — contractures as the result of fracture or trauma, the maltreated arthritic patient, and so forth. The responsibility for such inadequacy undoubtedly rests on the medical school, in whose curriculum physical medicine remains an adolescent; with teaching riveted on diagnosis and specific treatment, there is bare mention of physical measures and no specific instruction in physical technic.

It follows then that the average physician needs only to find himself relying solely on his own resources to realize his deficiencies. In the process of self-education, which from the patient's standpoint is distasteful and destructive of confidence and which is militarily inefficient because of delayed convalescence, he may then slowly acquire a proper appreciation of physical measures as a major asset in his medical efficiency.

I should like to review what I feel is a typical cross section of an average dispensary practice — some of the problems presented, the wide range of types of diseases — emphasizing especially the amazing breadth of application of physical measures and their value in speeding convalescence and return to duty.

With the attack on Pearl Harbor it became strategically necessary to establish fueling bases in the South Pacific to permit expeditious acquisition of islands by our fleet westward toward the Japanese mandates in order to maintain a vital supply route to Australia. The existing utter insecurity of the route augmented the exigency. Speed was of the utmost importance, for the Japanese were playing a similar game of checkerboard expansion south and eastward. The hurried nature of our mission did not permit selection of medical equipment and supplies

* The opinions and assertions contained herein are the private ones of the writer and are not to be considered as official or reflecting the views of the Navy Department or the naval service at large.

This work was done by Lieutenant Lowman as a student officer under the direction of Dr. F. H. Krusen while on assignment at the Mayo Foundation for instruction in physical medicine.

in the customary manner; we were issued a varied assortment which was immediately available.

In our particular expedition, the army contingent, whose mission was protection, was by far the larger and included a small station hospital, while the navy contingent comprised some 400 SeaBees, whose mission was construction of the base, plus 200 additional sailors constituting an air force and a base operating force. With the navy as a medical department there were seven corpsmen, myself and equipment for a dispensary.

Originally the intention had been that the navy should rely heavily on the army hospital, our dispensary functioning as a subsidiary field unit at which we should do little more than conduct sick call and treat minor ailments, and from which we should transfer men with anything beyond such ailments to the hospital. However, when we landed at our destination, a tropical, volcanic spot in the South Pacific inhabited only by native Polynesians, it quickly became apparent that, contrary to planning, the navy dispensary would have to function as nearly as possible on an independent basis.

This was necessary for several reasons. Primarily for safety purposes, the site for the hospital was selected at a spot 7 miles (11 kilometers) from the navy camp. The one road skirting the island, and our only connection to the hospital, was in actuality little more than a wagon trail which the deluges of tropical rain transformed into a mire often entirely impassable to traffic — even to jeeps. Transportation, therefore, to the hospital for treatment, even when possible, was for outpatients impractical from a standpoint of loss of work hours, and for ill patients an extremely uncomfortable and undesirable trip. In consequence, we were forced to establish ourselves to such a degree of self sufficiency that we might care for all patients except those with mania and those for whom surgical treatment was immediately necessary for whom emergency transportation via water to the hospital was available.

From a single pyramidal tent we expanded to three Quonsett huts (the igloo type of hut that is used so commonly at present overseas) and, thence, to six huts over a period of eight months. Our equipment, as I have mentioned, was an odd, scanty collection of what had been immediately available at the time of our departure; as a result it was necessary to improvise extensively. Fortunately one excellent baker and one infra-red unit heat lamp had been included.

The baker, mounted on four adjustable legs, was hinged at the top to permit adjustment of breadth and contained tiers of luminous lamps, all or groups of which could be switched on at a time. The heat lamp was the conventional type on an adjustable stand with a carborundum element recessed in a concave reflector and with interchangeable tungsten filament bulbs. As an additional heat lamp, a ship fitter rigged for us a metal stand of pipe on which he suspended an ordinary metal arc light reflector wired for use with luminous bulbs. By curtaining the sides to prevent dissipation of heat by cross currents of air, we were able to use this apparatus with surprising efficiency.

With these plus galvanized buckets obtained from the supply officer, two hot plates and an additional baker later needed and obtained from the army, we did our physical therapy. In the one building used jointly as a surgery, an x-ray room and a surgical dressing room, we had one portion partitioned off for physical therapy and a plinth constructed by the carpenters for use in massaging and baking of outpatients.

Among the seven corpsmen I was fortunate in having two men who had been recently on duty in a large naval hospital and both of whom had had practical training in simpler physical measures.

The man power situation in the navy was constantly critical. At the time of formation of our unit in the United States the demands on all sides for available

naval personnel were so exhausting that it was impossible to supply the expedition with anything more than a bare essential complement. Furthermore, this organization, the first of the SeaBee battalions, was composed for the most part of specialist laborers who had volunteered recently from civilian life. As a result, each man was an essential cog in the business of construction, whether he was a welder, a plumber or a crane operator. The extra personnel available for substitution in the event of illness or injury was small; the number qualified for such substitution was even more limited. Thus it constantly behooved us in the medical department to return men as quickly as possible to their duty status. By working with the personnel officer, we were able to graduate patients to restricted duties before their return to full duty. This proved a satisfactory plan in that it was thus possible to return convalescent patients earlier to their duties and to continue treatment at the same time on an outpatient basis.

Trauma

Now for an idea of our cases. Even while we were still aboard the transports anchored in the harbor, we had our first need for the heat lamp. Ashore, at the point on the island to which the greatest volume of cargo was being unloaded, we had set up a first aid tent, our intention being, first, to establish ourselves where we should be available for unloading casualties and, second, to have a battle dressing station ashore in case of attack. The spot chosen was the only one at which at this time a generator had been set up to provide electricity. We were not yet unpacked, the first night, when a sailor, the coxswain of a motor launch, was brought up to us limp and dazed from a leg injury. In stepping from his launch to a barge in the blackout, he had misjudged distances and fallen, his leg lodging between the steel sections of the barge and sustaining the brunt of the injury.

On examination we did not find any deformity or any shortening of the leg; still, all attempted motion was productive of excruciating pain, so that we were concerned with the possibility of a fracture. We did not have any x-ray apparatus available. After much cautious prodding and gentle passive manipulation, we felt that there probably was no fracture. For two days we kept the patient on a cot in the tent and with the heat lamp, routed out from the muddle of crated supplies, began to apply heat together with light massage. Satisfied at this point that the condition was solely contusion, we then introduced successively passive exercise, stimulating massage and finally active exercise. In three days the patient was up and on the fourth day back to work in his boat.

While cargo ships were still being unloaded, one of our bakers, who was working as a stevedore, sustained a severe contusion of the ankle and a phalangeal fracture of the right first toe from a falling T iron. The contusion and fracture healed well under the routine regimen, but there persisted pain and swelling about the dorsal portion of the foot, and despite active and passive exercises there subsequently developed roentgenologic evidence of Sudeck's atrophy. The patient was then treated with heat, massage and graduated exercises. He was returned to his job as a baker on a limited duty status and as an outpatient was treated daily with physical therapy. He improved slowly until after ten months he had recovered symptomatically and roentgenologically. Ordinarily this patient might have been returned to the United States for hospitalization. However, in view of the pressing need for him at the base, and because we felt that with patience we might cure him, he was retained.

Sprains of the back were frequent from the start. Our men, many of them middle aged, most of them recently recruited and unseasoned physically, were especially prone to this injury as a result of the strenuous construction work. Routinely we baked, massaged and strapped and returned them as outpatients to a light duty status.

Contusions, which were likewise common occurrences, were treated routinely with courses of heat and massage and the patients were retained on restricted duty status. In 2 cases of subacromial bursitis with calcification the patients were treated with heat, massage and graduated manipulations. In one there was complete subsidence of symptoms, while in the other no permanent benefits were obtained.

Fractures of bones of the hands, especially of the metacarpals, were the most commonly encountered fractures, the greater number of them being incurred through traumatism in construction jobs. All of the patients, immediately after a cast had been applied, were returned to a light duty status and encouraged to maintain function in the phalanges left free from plaster. After three to five weeks, when casts were removed, there were usually some residual stiffness and limitation of motion; heat, massage and active squeezing exercises of the hand then were instituted. In addition, after removal of the cast we endeavored to have each of these patients placed by the personnel officer in a job requiring exercise of the hand — the telephone switchboard was a favorite and effective assignment.

One patient, who had a fracture of the lower part of the radius which we were fortunate enough to reduce satisfactorily by simple traction and manipulation, came out of his cast with 20 degrees of residual flexion contracture and only 60 degrees of pronation and supination. We immediately started administration of heat, massage and passive exercise, graduating him to the task of taking jaunts twice a day about the dispensary swinging an anatomy book in order to get a correction of the contracture. Within a week the contracture loosened satisfactorily, leaving, however, the residual pronation-supination difficulty consequent to the fracture having been at the junction of the middle and lower third of the bone. Through the personnel officer, the patient then was assigned to work on the switchboard. The natural movement of reaching to the side of the switchboard for a line and carrying it up and medially to plug it into a circuit was perfect as a mild pronation-supination exercise. In three months we had obtained an excellent functional result and in the interim had been able to keep the patient in a productive work capacity through this occupational therapy.

Patients who had dislocations of joints were returned after reduction and immobilization to a restricted duty status and as outpatients were tended with physical therapy.

Patients who had symptomatic flatfoot were all returned to a light duty status for several days prior to return to full duty. The wearing of marine shoes, similar in build to the army shoe, together with corrective exercises provided relief in these cases.

Two cases of musculospiral paralysis were encountered. In one the patient had been traumatized severely in the overturning of a crane; in the other the patient had sustained his injury in the typical alcoholic manner. Both patients were treated by immobilization of the wrist in a cock splint and by heat, massage and electrical stimulation with a portable wall plate apparatus made available through the army. The alcoholic patient remained on a duty status all the while and recovered completely in six weeks. The other responded more slowly and after eight weeks was just beginning to show return of extensor function. In view of the expected prolonged convalescence of the latter patient and his negligible value thus as a crane operator, he returned to the United States to complete his recovery.

One patient, aged 21, who had an osteochondroma of the distal portion of the femur, was operated on and the tumor removed surgically. As soon as the incision had healed a course of massage was begun, the patient graduating to passive exercises and, thence, to crutches with active exercises and weight bear-

ing. Since he was reluctant to abandon his crutches completely because of the discomfort thus entailed from persisting adhesions, he was persuaded to try a return to light duty. On this status he was assigned the job of weaving designs in camouflage nets for guns. This work, on large nets which were spread out on stakes close to the ground, necessitated frequent flexion of the knees. With this occupational exercise together with daily baking and massage, the patient was completely asymptomatic within a few weeks.

Fungus Infection

The incidence of fungus infection, as might be expected in the tropics, was extremely high. Primarily the infection appeared as a common trichophytosis of the feet, but frequently it spread secondarily to produce by transplantation either unilateral or bilateral external otitis; less commonly it appeared on the hands; often it involved the axilla and groin. The unusual feature so commonly encountered in trichophytosis of the feet was the secondary invasion by a virulent organism which was productive of acute lymphangitis, lymphadenitis and a toxic febrile state characteristic of the cellulitis syndrome. Often the primary lesions of the foot were so insignificant that one tended to discount their role as the primary factor. Still, time and again after the application of continuous hot compresses to the rather benign appearing lesions of the feet together with, or often without, oral administration of sulfonamide drugs, we were surprised to obtain subsidence of the syndrome of cellulitis and appearance of frank trichophytosis of the foot.

In cases of such early idiopathic cellulitis, which is a characteristic early feature seen in filariasis, we remained open minded to the possibility of this infection, first, because among the native population the incidence of microfilarial infections was high (16 per cent) and, secondly, because in the light of present war experience with troops in the tropics, the old belief in the white man's immunity to filariasis is now substantially questioned; accordingly in all such cases we sought exhaustively, but without success, for the microfilaria.

In its wide prevalence, trichophytosis of the foot remained a constant and real problem because of its frequently incapacitating extent. Roughly, treatment was directed toward three phases: (1) trichophytosis with acute secondary infection — the cellulitis stage; (2) trichophytosis with chronic secondary infection, and (3) trichophytosis alone, of which there were few cases. In the first two of these, physical measures played the principal role. In the stage of cellulitis, the presence of a fungus was disregarded and treatment directed against the acute infection. The treatment consisted of rest in bed; local application of hot compresses of magnesium sulfate, boric acid, saline solution or the like, continuous or intermittent according to the extent of the infection and the degree of maceration; oral administration of sulfonamide drugs, and the usual systemic measures to combat the febrile reactions. With subsidence of the acute phase and progression into the second, the patient was graduated to a regimen of hot foot baths, thirty minutes twice a day in hot medicated solutions, with interim application of mild fungicidal medication. The patient was gradually allowed up and about, and as he improved the frequency of foot baths was decreased and the strength of fungicidal preparations increased.

The key to expeditious recovery, we felt, lay in the local application of wet heat, the heat being the important factor in that it effected localization and subsidence of secondary infection with a residual good field for application of fungicidal medication.

Kienböck's Disease

An interesting case was one of Kienböck's disease involving the right wrist. This disease, a sterile necrosis of the lunate bone of the wrist, is thought to be

produced through a traumatic destruction of blood supply. The case was that of a young man who for three years immediately preceding his entry into the service had done riveting, using the palm of his right hand to cushion the vibration from his riveter. Recurrently over a six month period, while at his work he had noticed weakness and tenderness in his wrist, but his condition had been repeatedly diagnosed and treated as a sprain. Under the stress of strenuous manual labor he presented when seen by us a return of weakness and tenderness. Roentgenologically the condition was diagnosed as Kienböck's disease, and we immediately started a regimen which included rest by splinting, together with daily heat and massage. When the patient was last seen, three months after initiation of treatment, there had not been any substantial improvement, and it was felt that the chronicity of the condition probably outweighed the therapeutic effectiveness of physical measures.

Tropical Phagedena

Common throughout the South Pacific is the so-called tropical phagedena, an indolent, chronic ulcer which tends to develop insidiously from trivial, minute abrasions about relatively bloodless areas of the lower extremities. The etiologic factors have not been agreed on by investigators in tropical medicine. Strangely enough, tropical phagedena was not seen among the natives. Staphylococci, streptococci, fusiform bacilli in association with spirochetes and various fungi have all in turn been indicted by investigators as the specific agent. In our observation, the contradictory finding of various ones of these organisms in different cases left us unconvinced as to which should be definitely incriminated; from therapeutic results obtained we were inclined toward indictment of the fusiform bacilli and spirochetes.

We were plagued with these ulcers. With our men working bare-legged through mud and dirt, lava rock, coral and brush, the opportunities for abrasions were great. Probably the relative incidence was actually low, for I have been told that on one island west of us entire wards were filled with patients suffering from these nonresponding ulcers to such an extent that the condition approached a military problem. The usual story with us was one of neglect; the lesions were on the average two to three weeks old when first seen at the dispensary. The initial abrasion had been so benign — a scratch, a bruise or a coral cut — that the patient had considered it insignificant. As the days went by, it not only failed to heal but widened, and from beneath a crusted covering seeped a thin seropurulent discharge. At this stage, when the patient reported to sick bay, removal of the crust revealed a painless, chronic, indolent ulcer, distinctly punched out in appearance and varying from 1 to 5 cm. in diameter.

None of the usual medicinal lotions or ointments would affect the condition. Sulfonamide compounds, administered locally or orally, were completely ineffective. Cognizant of claims of some investigators who insisted that the process is fusospirochetal in origin, we turned to arsenical compounds. A 10 per cent solution of neoarsphenamine in glycerine applied locally to early lesions occasionally produced healing — the procedure being to alternate this daily with dressings of cod liver oil ointment. Generally, however, it was necessary to resort to intravenous administration of one of the arsenical compounds. We gave initially half a dose (30 mg. in the case of mapharsen [the hemialcoholate of 3-amino-4-hydroxy phenylassine oxide hydrochloride]) and, thereafter, full doses at weekly intervals for three to six injections according to the clinical response. In conjunction with arsenical therapy, we felt that local application of heat was of major importance in stimulating the repair process in the indolent wound.

In those cases in which the lesion was treated locally with arsenical com-

pounds, thirty minute sessions of hot compresses to the wound were employed twice daily. In those cases in which the patient received arsenical compounds only intravenously, we employed hot compresses twice daily for thirty minutes locally and in the interim used dressings of cod liver oil ointment. With such regimens we obtained satisfactory results. Only 1 patient failed to respond, and this failure we felt was due to the fact that arsenical treatment was discontinued in the face of an intercurrent bronchopneumonia which we desired to treat with sulfonamide drugs. In this case the local regimen of hot compresses and dressings of bland ointment was continued but in itself was ineffectual; the patient was returned subsequently to the United States, and the ultimate outcome is unknown.

Other Conditions

There were many other types of cases. Sprains of joints and muscles were extremely common and routinely were treated with physical therapy and rest. In a case of gonorrheal prostatitis in which the infection was resistant to the sulfonamide compounds, a G.I. dish pan was used for sitz baths while we waited for a ship to transport the patient back to the United States for fever therapy. In the treatment of burns we abandoned tannic acid and silver nitrate in favor of an ointment containing 10 per cent sulfathiazole and 20 per cent of cod liver oil, and in all cases in which extensive areas were involved, local application of heat in the form of cradles was felt to be an essential and valuable adjunct. The incidence of burns, however, was low and their severity moderate, so that this conception of the value of heat in such cases is not supported by statistics. Still, a three year old native child who was burned extensively over the entire anterior part of the trunk from a fall into an oil fire was treated for weeks under such a heat cradle; he recovered in defiance of our hopeless attitude and undoubtedly owes much to the physiologic effect of the heat.

Conclusion

I have touched briefly on some of the simpler forms of physical therapy which are adaptable to the use of and are of value to the medical officer in the isolated military dispensary. The importance of physical therapy as an adjunct in such a setup is great. In a situation wherein man-hours are the paramount consideration, the value of physical medicine in speeding convalescence is its shining virtue. I personally feel that when properly employed it is the greatest single asset in effecting a reduction of work hours lost through sickness. The need for greater appreciation, knowledge and judicious application is thus self evident.

FOOT PROBLEMS IN WARTIME *

HENRY H. JORDAN, M.D.

NEW YORK, N. Y.

The common disorders of the foot, one of the plagues of civilized man, have been for decades a "Cinderella" of the medical profession. It has been so easy to go to the "5 and 10" or to a drug store to buy a pair of foot plates for almost any of the numerous ailments which afflict the feet that most physicians have considered it beneath their dignity to prescribe such appliances. The majority of orthopedic surgeons have certainly looked on the foot brace as a sometimes necessary evil which has received too much publicity through the advertisements of shoe factories, drug stores and surgical firms to deserve a place in the armamentarium of a scientific orthopedic surgeon.

There has been, of course, a small minority of orthopedic surgeons who for years have recognized the tremendous social and economic importance of the problems originating from the adaptation of the human foot to the conditions of modern civilization. But this small group, including such personalities as Royal Whitman, Fritz Lange, Hans von Baeyer, Plato Schwartz and Dudley Morton, while establishing the basic scientific principles for the subject matter under discussion, have not been in a position to influence materially and to alter the attitude of the medical profession in general, nor has the result of their scientific studies been utilized commercially on a nation-wide scale for the benefit of the public. One reason, and perhaps the most important one, for this negative attitude toward scientific progress in such a vital problem, is explained in statistics whose impressive figures show the economic significance of commercial orthopedic appliances, so-called orthopedic shoes, etc.

The all-out war in which we are now engaged must and will change the situation through dire necessity. It is the purpose of this paper to outline some of the facts that should influence future development in the treatment of common disorders of the foot. The discussion is limited to the treatment and prophylaxis of weak and painful feet among the civilian population. Foot problems in the armed forces, as well as the more familiar pathologic entities, viz., congenital deformities, the results of paralysis and spastic disorders, malunited fractures, Sudeck's atrophy and the sequelae of rheumatoid arthritis, osteomyelitis, etc., are not within the scope of this paper.

In times of peace it is entirely a matter of personal choice whether or not the individual takes proper care of his feet, what measures he prefers to relieve foot trouble, to whom he turns for advice and treatment and how much money he can or will spend for this purpose. An all-out war demands maximum efficiency of each individual and a maximum saving of essential materials. It becomes a moral obligation of every person to see to it that his efficiency in behalf of the war effort is not hampered by avoidable disabilities, including those of the feet, and that his efficiency is maintained or restored with a minimum expenditure of time and materials. Shoes are rationed, and the materials generally required for the manufacture of foot braces and arch supports are scarce. It is obvious, therefore, that every foot brace which does not serve the purpose of permanently relieving the patient's disability is a waste of material. Correct diagnosis of the foot

* Read before the Eastern Section, American Congress of Physical Therapy, New York, N. Y., April 10, 1943.

disorder causing disability, adequate treatment prior to the use of an orthopedic appliance (when necessary) and manufacture of the most efficient foot brace — these considerations are of the utmost importance and among the many additional responsibilities that the war has placed squarely on the shoulders of the medical profession.

I shall now discuss some of the pertinent problems concerning feet, shoes and orthopedic appliances, including some of the methods of conservative and surgical treatment of foot disorders from the viewpoint of the nation at war.

Naturally, we are not concerned with the normal painless foot causing no disability. We must realize, however, that with gasoline rationing, with many changes of occupation because of the war effort, with additional hours of standing imposed by unaccustomed housework, with walking on air raid duty, etc., increasing demands are constantly being made on hitherto normal feet, which may break down under the strain unless prophylactic measures are used.

We cannot intelligently attack the problems involved unless we agree on a definition of the normal foot.

Traditional ideas regarding the form and function of the human foot must change as a result of recent research and practical experience. It is not unusual to find a waiter who can stand and run on the concrete floor of a restaurant for long working hours over a period of years without pain or disability in spite of the fact that he has rigid, pronated flat feet of the highest degree. On the other hand, we have seen ballet dancers completely disabled by excruciating foot pain in spite of the ideal anatomic configuration of the feet and a supertrained athletic musculature. Examination of hundreds of selectees at the army induction centers shows — not to the surprise of those who have studied the foot of civilized man for years — a preponderance of pedes plano valgi of the second or third degree that has never caused pain or disability, perhaps with the exception of corns and callosities that have had to be removed from time to time. Thus we come to the conclusion that the normal foot is one with good physiologic function, regardless of the anatomic configuration.

Physiologic function requires, first of all, stability in adequate weight-bearing alinement. The recognition of foot disorders, as well as their efficient treatment, depends on the realization of the importance of correct static alinement of the entire lower extremity to the line of gravity and, only to a much less degree, on the observation of the intrinsic structures of the foot proper.

For the purpose of discussion it is advisable to divide the common foot disorders into two groups, the first one dealing with stance and the second with locomotion. This division of the subject matter is justified by practical experience. Most of the common foot disorders occur in persons with standing occupations and very few in those whose work requires a great deal of walking. The two groups differ also in the most frequent complaints. Pain in the first group centers around the ankle joint, in the tarsal bones, in the knee, in the lower back and, not infrequently, in the musculature of the lower leg. Pain in the second group affects as a rule the metatarsal region.

Hallux rigidus, hallux flexus, plantar warts and osteoarthritic changes interfere much more with walking than with standing.

Let us look for a moment at the correct postural alinement of the lower extremity while standing. The plumb line from the center of the hip joint runs through the center of the knee joint and through the center of the ankle joint and hits the ground in the center of the heel. This normal re-

lationship leads to proper weight distribution with a minimum of muscular effort to maintain stability and consequently with a minimum of fatigue while standing. Any deviation from the normal postural alinement in regard to the line of gravity leads to skeletal instability. If the deviation from the normal alinement occurs in the skeleton of the foot, e. g., through the common valgus position of the heel, the ligaments of the foot and ankle are called on to maintain proper weight-bearing alinement of the framework of the foot. According to the constitutional tensile strength of the ligaments in each individual case, painless function of the foot on standing will be maintained for a certain period in spite of the underlying postural malalinement of the skeleton. No matter how strong the ligaments of the foot and ankle may be, it will not be long before the musculature is called into action to substitute muscular stability for the loss of skeletal and ligamentous stability. At this point the foot becomes painful.

It has been the traditional belief that the long extrinsic and the short intrinsic muscles of the foot, especially those extrinsic muscles that cross the subtalar joint, play a definite role in maintaining correct postural alinement of the lower extremity in stance as well as in locomotion. Recent studies by Dudley Morton, Plato Schwartz and others have shown convincingly that this is not the case. The musculature controlling the foot goes into action while standing only in the presence of skeletal and ligamentous instability. As a result, abnormal demands are made on the musculature, followed by accumulation of waste products of muscular metabolism and disturbed muscular equilibrium between pronator and supinator muscle groups, leading finally to the well known picture of the painful so-called "spastic," or rigid, flatfoot.

The disorder described is the most common of all foot problems. It is obvious that the treatment requires orthopedic appliances that will restore without fail the correct static alinement of the foot. Royal Whitman's "active correcting" foot brace is, in my experience, a short cut to the restoration of normal conditions and consequently is the method of choice for quick and complete rehabilitation. No arch support or physical therapy will serve this particular purpose, and the best orthopedic shoe, however efficient when new, is of short service as far as maintenance of proper static alinement against gravity is concerned.

From our present conception of the role of the musculature in the maintenance of correct postural alinement of the foot in stance, it is obvious that one cannot expect results from building up the musculature that controls the foot. Too much emphasis has been placed on the disadvantage and danger of rigid foot braces as compared with treatment by exercise for the development of a strong musculature. I must stress the point that in the most common disorder of the foot, namely the valgus position of the tarsus, which is usually followed by pathologic abduction of the forefoot, supination of the first metatarsal bone, excessive weight bearing on the second metatarsal head, development of a spur at the os calcis, etc., the musculature is not at fault and consequently requires no treatment. This statement is borne out by observation of thousands of pertinent cases. Examination of professional ballet dancers with acrobatic training shows, for example, that the majority have pedes plano valgi and pes transversoplanus, frequently with hallux valgus and hammer toe deformities in spite of the best possible development of the leg muscles and the intrinsic muscles of the foot. These dancers rarely complain of pain and disability while performing. They have their foot troubles "off stage," when standing at the kitchen sink or while watching a performance as standees. It would be illogical to attempt to cure their foot troubles with muscular exercises.

Analysis of the static and dynamic function of the foot in locomotion presents an extremely difficult and involved task. Fortunately, most of the foot disorders that come to our attention are more concerned with stance than with locomotion. As has been said, pain during locomotion is most frequently complained of in the metatarsal region. While recognizing the importance of Dudley Morton's studies of the weight distribution on the metatarsal bones, of the frequent occurrence of a short first and long second metatarsal bone, with disabling pain under the head of the second and sometimes the third metatarsal, I feel that most of the disorders of the metatarsal region producing pain on locomotion are the result of abnormal weight distribution caused by the faulty static alinement of the foot as a whole in regard to the line of gravity of the lower extremity. I believe that the majority of foot disorders, regardless of the site of their local manifestations, originate in the valgus position of the heel.

This is especially true of hallux valgus and hallux rigidus or flexus with osteoarthritic changes of the first metatarsophalangeal joint and formation of painful bursae and callosities under the heads of the second and third metatarsal bones. If locomotion occurs with the tarsus in the valgus position and, as commonly observed, with the weight-bearing line almost entirely through the first metatarsal bones and the great toe, the demands on the first metatarsophalangeal joint and the sesamoids of the great toe are increased to such a degree that the cartilage of these structures is worn off prematurely, inducing traumatic osteoarthritic changes and finally limitation of motion. Without change in the postural alinement of the foot, the interphalangeal joint of the great toe substitutes for the lack of motion at the first metatarsophalangeal joint, as proved by the frequent observation of increased motility at the interphalangeal joint and of a callosity on the sole of this joint. When the first metatarsal bone and the great toe become too painful, they are held in supination and weight is borne on the second and third metatarsal bones. It is now no longer sufficient to support a short first metatarsal bone by means of a Morton insole for correct weight distribution on the metatarsal heads. Regardless of the procedure used to relieve pain from the metatarsal region, a permanent cure cannot be obtained without correcting the malalinement of the entire foot by forcing the tarsus and especially the heel to remain within the line of gravity.

Hammer toes, a frequent source of pain caused by corns and bursae, with few exceptions must also be considered among the sequelae of the postural malalinement of the entire foot, with its influence on the length of the tendons controlling the toes.

While it is not within the scope of this paper to give a complete survey of the various deformities and diseases of the foot and its intrinsic structures, I must briefly mention a few more of the most common disorders. A short achilles tendon has frequently been regarded as being the cause of a pes plano valgus, and tendon lengthening has been resorted to. In the common painful weak foot, limitation of dorsiflexion at the ankle joint is the result rather than the cause of the disorder, and stretching of the heel cord is rarely necessary.

I agree with Dudley Morton that roentgen examination of the foot is a prerequisite to adequate treatment. On roentgen examination, we find in a considerable number of cases accessory scaphoids or an unusually large scaphoid bone, a so-called "hooked" scaphoid. This abnormality plays an important role in the development of the foot during childhood and adolescence. It impairs the function of the tibialis tendon, disturbing the equilibrium between pronating and supinating muscle groups. The over development of the scaphoid also tends to force the forefoot into abduction or ever-

sion. The possessor of such a foot walks with his toes pointing outward, thereby increasing the tendency toward the valgus position of the heel, which is usually present with all its sequelae. Foot disabilities in the presence of accessory or hooked scaphoids require surgical correction, with translocation of the tibialis tendon.

The common spur of the os calcis, on the other hand, rarely presents an indication for surgical procedure. The bony spur proper is not painful. If it is large and prominent, a bursa forms and the ensuing bursitis causes the painful disability. In my experience, it is always possible to relieve permanently this painful condition by an unweighting celluloid foot plate made to the plaster cast of the foot.

Another disorder of the heel that may cause considerable disability is frequently unrecognized. Pain in the region of the insertion of the achilles tendon at the os calcis is often diagnosed as achillodynia or as bursitis, i. e., inflammation of one of the bursae in the region of the achilles tendon. One frequently finds irritation of the skin with callous formation, marked swelling and exquisite pain on pressure exactly at the upper margin of the posterior tuberosity of the os calcis. The condition is caused by pressure and rubbing of a hard counter of an ill fitting shoe against the distal extremity of the achilles tendon and the underlying bone. Roentgen examination shows a typical configuration of the posterior proximal part of the os calcis, first described by Haglund: "Haglund heel." If softening of the counter of the shoe and relief of pressure by means of a horseshoe felt pad effects no cure, a surgical procedure for removal of the offending ridge of the os calcis is indicated.

Sesamoiditis of one or both sesamoids of the great toe is not uncommon. With special x-ray technic, the sesamoids can be distinctly visualized, and sometimes structural changes, e. g., osteochondritis, are found. Roentgenograms of the two feet must be taken for comparison; otherwise a bipartite sesamoid may be mistaken for a fracture. Recently I have seen a number of cases in which an acute inflammation of the first metatarsophalangeal joint, similar to an attack of gout, has been the result of an infectious or toxic metastasis from a sore throat. In some instances, a fungous infection between the toes, present in almost every foot and always requiring treatment, may lead to an inflammation of the first metatarsophalangeal joint or of a tendon sheath on the dorsum of the foot. I have seen reports, but have encountered no cases myself, in which phlebitis has been attributed to fungous infection.

A word may be added concerning varicose veins and phlebitis. Varicose veins are not the cause of nightly spasms (cramps) in the calf muscles. Such attacks are due to an accumulation of waste products from muscular metabolism, always a sign of "insufficiency" of the foot due to malposition. Such cramps do not recur if correct static alinement is restored and maintained.

Phlebitis in the lower leg should be treated with the patient ambulatory if there is no elevation of temperature, or after an initial rise in temperature has subsided. With well applied compression strappings, e. g., elastoplast or cruricast bandages, the skin over the tibial crest being carefully protected with a strip of felt, the patient will be relieved from pain and may resume his work, even if this requires prolonged standing. The common fear of embolism is not justified, especially in the presence of varicose veins in which, as Magnus and others have demonstrated, the direction of the venous circulation is reversed.

In bygone days of peace and prosperity, the public at large indulged in orthopedic shoes when seeking relief from common disorders of the feet. Foot and shoe being inseparable items in the mind of civilized man, it is perhaps

natural that the possessor of a painful foot should first blame the shoe for his disability and seek relief by trying to find a more comfortable last. This tendency has been greatly encouraged by impressive sales talk advertising orthopedic shoes of every conceivable description, with every manufacturer claiming to have perfected the highest achievement in corrective or supporting footwear on the basis of pure medical science. It is a common experience in the office of the orthopedic surgeon to have a patient arrive with a suitcase full of different types of so-called "orthopedic shoes," which frequenty have brought economic distress but no physical comfort. It is regrettable that physicians have followed the public trend by prescribing from the very beginning one or another brand of such shoes with some modifications according to the requirements of the individual case.

Recently I had to reexamine and treat a group of patients with common foot disorders. Most of them had received no other treatment than so-called "modified orthopedic oxfords" with "cookies," metatarsal pads, Denver heels, wedged heels or elongated heels. Most of these patients obtained some relief for a limited period, but their symptoms recurred as soon as the shoes were worn out. In not one of them was the underlying valgus position of the heel corrected. The change to Whitman type foot braces effected prompt and apparently permanent relief when flexible feet were concerned.

The rationing of shoes, deplorable as the necessity may be, has one advantage. It forces the patient to seek relief from his discomfort without first resorting to a legion of "orthopedic shoes." Moreover, rationing of shoes makes the public shoe conscious. Longevity of the shoe becomes important. If the shoe is out of shape after a short period, its wearer realizes that something must be wrong with the foot.

It is difficult to understand why in the past the shoe has been burdened with the task of correcting foot deformities. A shoe made to order by an expert shoemaker is undoubtedly able to correct some of the minor foot deformities, to accommodate bunions and hammer toes without pressure and to maintain for a certain but limited period the correct static alinement of the foot in regard to the vertical axis of the lower extremity. The expense of a good orthopedic shoe made to order is prohibitive to the majority of patients. But, apart from this fact, the shoe has tasks other than those of a corrective foot brace. The shoe must be flexible and resilient to allow propu'sion of the foot and certain excessive motions needed when one is driving a car, riding a bicycle or playing the piano. A shoe cannot meet the requirements of a relaxed foot which needs correction by a rigid orthopedic appliance. Thus it is only logical that shoe and foot brace must share the work.

There is a common misconception that wearing a foot brace requires larger and bulkier shoes and that the life of the shoe is shortened by a rigid brace. The opposite of this belief is the truth. A foot in postural malalinement, or one with deformities such as hallux valgus and marked hammer toes, deforms a new shoe while the shoe is being "broken in." An adequate correcting or supporting foot brace, on the other hand, maintains the correct static alinement of the foot. It compensates the deforming forces of the pathologic foot under the influence of gravity and thus preserves the original shape of the shoe. More than twenty years of experience have shown me that no matter how bad the postural alinement or the deformity of the foot, the wearing of a properly fitted orthopedic appliance will prolong the life of the shoe indefinitely. Of course, new foot braces should be worn in new shoes only and never in shoes that have already yielded to the malformation of the foot. Shoe economy, so essential for the duration of the war, will be greatly facilitated if weak and deformed feet are properly corrected by means of an adequate foot brace prior to the purchase of new shoes.

A new shoe to be worn with a corrective or supporting foot brace serves

as a welcome criterion for the efficiency of the corrective appliance. Inspection of the heels will show the impact of weightbearing. If the heels are worn off in the midline, i. e., symmetric to the seam of the counter, this indicates neutral or correct position of the heel. If the heel is worn off lateral to the midline, we know that the valgus position of the heel has not been sufficiently corrected and we can adjust the corrective appliance accordingly. Heel inspection may thus be compared with tire inspection. Just as the wearing off of an automobile tire indicates the correct or incorrect position of the axle, so the wearing off of the heel bespeaks the alinement of the lower extremity in stance and locomotion.

Our armamentarium for treatment of the common foot disorders discussed in this paper comprises orthopedic appliances, physical therapy, such conservative measures as manipulations and strappings and finally surgical procedures.

There is no doubt in my mind that for the vast majority of foot disorders, an orthopedic appliance is indispensable. It is frequently the only treatment required. If the indication for an orthopedic appliance is correct and the brace is properly fitted, it means a short cut to a permanent result.

In the foregoing discussion I have frequently mentioned the Whitman type foot brace because this brace fulfills the requirements of the majority of patients. I am referring to the original "active correcting" foot brace designed by Royal Whitman and not to any of the modifications frequently used. The combination of a Whitman brace with a support for the longitudinal arch and, worse, with a metatarsal pad, is a technical monstrosity. This modification is chiefly responsible for the dislike of the Whitman brace which I have found in many quarters.

The Whitman type foot brace cannot be used for a rigid foot. The flexibility of the foot is a prerequisite for the correct plaster of paris cast. If the foot is rigid, it requires preliminary treatment by conservative or surgical measures. If relaxation is impossible, as in the case of severe arthritis or after a malunited fracture, a different type of foot plate must be used.

For the painful rigid foot, for a foot with deformities that cannot be corrected by surgical intervention and for the foot in which metatarsalgia dominates the picture, I consider the Lange type cellu'oid foot plate with a lateral flange as the appliance of choice. The celluloid foot plate resembles in many respects a full upper denture and should be built and manufactured according to the exacting principles of a dental laboratory. The celluloid plate is also the plate of choice for a calcaneal spur.

This is not the place to enter into a discussion of the respective merits of a great number of soft, semirigid and rigid foot plates in common use.

I wish to emphasize that for the common foot disorders an appliance made without a plaster of paris model of the corrected flexible foot, or a plate without a lateral border (in the case of a valgus position of the heel), is insufficient and a waste of material. The plate without a lateral flange or external border burdens the shoe with the task of preventing the foot from following gravity. With the Schaffer type plate or any other insole without a lateral border and with a medial wedge under the heel, there will be no correction of the valgus position of the heel. The foot will slide on the inclined plane of the plate until the lateral section of the uppers of the shoe resists. The result is a deformed shoe with the uppers bulging far over the lateral margin of the sole and the heel.

Frequently we encounter the argument that neither the heavy, rigid Whitman type foot brace nor the more bulky and expensive celluloid plate is really necessary because the patient finds relief from his pain by one or another insole type foot plate to be found on the market, or even by some alteration of his shoes with a Denver heel, a medial wedge or a metatarsal pad.

With regard to the satisfactory results or so-called "cures" which have been effected by practically every type of foot plate, there is no doubt that, in many

instances, any type will relieve the pain of an aching foot for a limited time. I have pointed out, for instance, that the pain while standing occurs in the case of skeletal instability, when the ligaments are no longer in a position to maintain the correct postural alinement of the foot and the muscles are called on to substitute muscular stability for skeletal instability. When the muscles become overtired, the foot collapses and aches, but the muscles are still able to bring the foot into and maintain it in a correct position. A reminder, or stimulus, is all that is needed. Any foreign body placed inside the shoe within the longitudinal arch of the foot, producing pressure on the sole of the foot when the muscles relax, will act as a spur and furnish the necessary stimulus for increased muscle action. I believe that the transient success of many foot plates now on the market is due to such "foreign body action."

It is our duty for the duration of the war to avoid waste of essential materials in useless foot plates and to prolong the lives of our shoes. It is, therefore, essential to understand the basic principles of the common foot disorders resulting from postural malalinement and to use from the very beginning the most effective means for permanent relief.

With hesitation I approach the subject of physical therapy in common disorders of the foot. The role of physical therapy for the treatment of foot disabilities as discussed in this paper must be a limited one. Most authors who have made a careful study of the foot in stance and locomotion agree that in the majority of cases there is no indication for building-up exercises. I know that the public has been educated to regard foot exercises as an important factor in routine hygiene as well as in the treatment of foot disorders, but a convincing number of examples show that in the most common disorders the musculature is not at fault. Physical therapy has, of course, its undisputed significance in the treatment of inflammatory and circulatory disturbances of the lower extremities. Among the pathologic conditions that can be greatly improved by physical therapy, I mention myogeloses in the fatigued musculature of the lower leg and some frequently overlooked disorders of the structure of the sole of the foot, such as infiltration and spasms in the short flexors and in the abductor of the great toe, and fibrositis. Histamine ion transfer has proved to be of superior value in these conditions.

Strappings with adhesive tape or elastoplast or cruricast, in the form either of a metatarsal strapping or of a so-called "inversion" strapping for a pes valgus, and the Gibney boot for a weak ankle are in common use. They certainly have their indications. They bring prompt relief in selected cases if properly applied.

Whenever strappings are to be used, it is advisable to apply them from the toes to below the knee after the leg has been raised for fifteen or twenty minutes. This will improve venous circulation, which is frequently deficient in the conditions to be treated by strapping of the foot.

According to my observation, strappings are too frequently used as a preliminary treatment. At a time when lost working hours and waste of materials are of such great importance for the war effort, no time should be wasted in applying repeated strappings to a foot which from the beginning demonstrates the need for a corrective orthopedic appliance.

Finally, we come to the operative procedures. My personal point of view is both conservative and radical.

A rigid pronated flat foot requires restoration of flexibility prior to application of a foot brace. If clinical and roentgen examinations demonstrate that the foot can be rendered flexible by means of manipulation, this should be carried out at once, gently but thoroughly, with the patient under general anesthesia. The position obtained must be maintained for several weeks by means of fixation in a plaster of paris cast. The cast should be a walking cast, permitting the patient to be ambulatory and perhaps to return to work. A plaster of paris

model for the foot brace should be taken before the walking cast is applied in order to have the brace ready for fitting when the cast is removed.

Surgical procedures are indicated as a first step in the treatment of foot disorders in the case of accessory or hooked scaphoids with displacement of the tibialis tendon. This is especially true during adolescence. A hallux valgus or hallux rigidus of considerable degree and hammer toes interfering with the wearing of a regular shoe require surgical intervention unless there is a general contraindication. In treating hammer toes, one should not overlook the frequent occurrence of subluxation or dislocation of the proximal phalanx of the toe at the metatarsophalangeal joint. This is best treated by resection of the major part of the proximal phalanx from a dorsolateral incision. Exarticulation of a markedly deformed rudimentary fifth toe is not usually popular. I prefer the results obtained by this simple method to the more complicated plastic procedures, which rarely give a permanent result.

The hallux valgus operation occurs so frequently on the orthopedic operative schedule that it deserves a brief discussion. We have used the Keller-Brandes procedure exclusively since 1928 with the most gratifying permanent results. The procedure consists of removal of the so-called "exostoses," as a rule a medial and a dorsal exostosis from the head of the first metatarsal bone, and of resection of at least the proximal two thirds of the proximal phalanx of the great toe. This must be done without injury to the extensor and flexor tendons and without removal of a bursa, when present. Traction to the great toe in a plaster of paris cast for one week assures a good scar and avoids too much retraction of the tendons. After a week or ten days, a cruricast strapping is applied from the toes to the knee and the patient may be ambulatory. A Lange type celluloid foot plate must be worn in a modified oxford shoe for at least six months and at night a hallux valgus splint. The foot of the bed remains elevated by 8 inch shock blocks for several months. Most of our patients, including sales girls and factory workers, have been able to return to work after four weeks. Complete rehabilitation, however, requires about six months, at the end of which time the patient is able to resume all his activities, including sports and dancing, without pain or danger of recurrence. The Keller-Brandes procedure, as described, has the advantage of a radical permanent elimination of the factors that form the hallux valgus. This method does not interfere with the important weight-bearing structures of the foot, especially with the head of the first metatarsal bone. We have seen many deplorable failures of operations performed on the head of the first metatarsal bone and we have had to reoperate on a number of patients who had suffered a disabling recurrence of the original deformity after simple exostectomy or operation on the soft tissues only.

Any operative procedure on the foot, no matter how small or simple, entails a considerable period of disability. Recovery from the Keller-Brandes method is as rapid as from any of the other known operations. Being a radical procedure, it is now, more than ever, the method of choice for the treatment of hallux valgus and hallux rigidus as a definite short cut to quick and permanent rehabilitation.

This is no time for treatment which may give temporary relief if one is in a position to obtain a permanent result by other modalities. The radical treatment that usually forms the final step in rehabilitation after many other types of treatment have been tried without success should now be applied as the first measure.

The slogan for treatment of common foot disorders under wartime conditions should read: "Minimum treatment for maximum effect, but when necessary radical treatment for a quick and permanent result."

110 East 93rd Street.

PRELIMINARY REPORT OF RESULTS OBSERVED IN EIGHTY CASES OF INTRACTABLE BRONCHIAL ASTHMA *

G. P. MILEY, M.D.,
R. E. SEIDEL, M.D.
and
J. A. CHRISTENSEN, M.D.
PHILADELPHIA, PENNSYLVANIA

We have in the last three years and ten months applied the Knott technic of ultraviolet blood irradiation to 80 persons suffering from severe bronchial asthma of the intractable type. During this period we have observed many interesting and encouraging clinical effects following the use of this type of therapy and feel that this preliminary report may prove of general interest. The report includes all the patients who received ultraviolet blood irradiation therapy between Nov. 1, 1938 and Oct. 1, 1942, thus allowing interpretation of results to be based on a series of consecutive unselected cases.

The Knott technic of irradiating blood with ultraviolet rays consists, briefly, of withdrawing a predetermined amount of the patient's venous blood, citrating it and passing it through a Knott hemoirradiator, a precision machine which automatically exposes the citrated blood to an intense source of ultraviolet energy and returns it to the venous circulation of the patient. This has already been described independently in detail by Rebbeck[1, 2, 3, 4, 5, 6], Hancock[7, 8], Barrett[9, 10, 11], and Miley[12, 13, 14, 15, 16, 17, 18].

Naturally, in using an original method of therapy, we were confronted from the first with many problems in diagnosis and treatment. We have by no means solved all these problems but have tried to simplify them by adhering to the same general diagnostic criteria and by persisting with a definite plan of management for carefully diagnosed intractable bronchial asthma.

Diagnostic Criteria

The following characteristics were present in all the cases included in this report:

1. Recurrent attacks of wheezy dyspnea with intermittent periods of relief varying in degree and frequency.

2. A marked refractoriness to most standard types of treatment, as judged by the following criteria:

(*a*) Failure to respond to removal of known aggravating extrinsic factors, e. g. dusts, pollens and foods.

(*b*) Refractoriness to all desensitization efforts.

(*c*) Refractoriness to bronchoscopy and bronchoscopic "drainage" with or without supplementary use of autogenous vaccine.

(*d*) Failure of intranasal operations performed for the relief of nasal obstruction or as a treatment of chronic sinus infection to relieve asthmatic symptoms.

(*e*) Temporary or no relief following inhalation or injection of epinephrine or ephedrine preparations.

* From the Department of Pharmacology and the Blood Irradiation Clinic of the Hahnemann Medical College and Hospital of Philadelphia.
* Read at the Twenty-second Annual Session of the American Congress of Physical Therapy, Chicago, Illinois, September 8, 1943.

3. An obscure etiologic basis of the asthmatic attacks at the time the patient was first seen, though several types of predisposing factors were believed to have been present originally, e. g. a background of extrinsic asthma, frequently recurring colds, reflex or directly irritative effects arising from lesions in the nose and/or sinuses, psychogenic causes and vague toxemias secondary to equally vague sources of infection or metabolic unbalance.

4. Absence of demonstrable neoplastic or granulomatous pulmonary lesions shown by careful roentgen examination.

5. Absence of organic heart disease as far as could be judged by a negative history and negative physical, roentgenographic and electrocardiographic findings.

Management of Patient

1. Ultraviolet blood irradiation therapy is administered every four to six weeks until it is felt that the patient's symptoms have remained markedly ameliorated over a two month period; the therapy then is repeated at eight to ten week intervals with the object of reducing the frequency to three or four treatments yearly.

2. Injections of epinephrine or ephedrine are withdrawn to as full an extent as is practically possible.

3. Inhalation of vaporized epinephrine or ephedrine products is continued for the first few months in some cases.

4. Extrinsic aggravating factors are eliminated when possible.

5. Radical operative procedures on the nose and sinuses are not permitted except as emergency measures. This precaution is observed because we feel that bronchial asthma is primarily a systemic disease and that, except in rare instances, the majority of asthmatic patients seen by us, after having been subjected to such procedures, have not been improved, but, on the contrary, have been seriously debilitated.

6. The use of the bronchoscope has been limited as a rule to a single diagnostic procedure, and caution has been exercised in the case of extremely debilitated patients.

Our results with 80 patients suffering from intractable bronchial asthma have we believe, been extremely gratifying. They are summarized in the accompanying table, and, in addition, detailed reports of 3 cases are presented.

Report of Cases

CASE 4. — Mrs. A. S., aged 46, was first seen May 17, 1940 and was admitted to the Hahnemann Hospital at that time. She gave a history of intractable bronchial asthma and chronic sinusitis for the previous twenty-six years, unrelieved by desensitization attempts, bronchoscopy, vaccine therapy, various intranasal operations, cholecystectomy in 1939 and injections and inhalation of epinephrine and ephedrine products. Physical examination revealed constant and severe wheezy dyspnea, marked generalized cyanosis and extreme weakness and debility; the patient was apprehensive and obviously suffering a severe psychoneurosis secondary to her ill health. Laboratory examinations gave essentially normal results with the exception of a leukocyte count of 12,100; eosinphilia was absent. A diagnosis of intrinsic bronchial asthma was made, and ultraviolet blood irradiation therapy was administered the same day. That night the patient experienced an exacerbation of her asthmatic symptoms comparable to previous severe attacks. She was discharged from the hospital at the end of four days.

The patient was next seen June 18, she reported that she had had several asthmatic attacks since the first blood irradiation but stated that they were not so severe or so frequent as previously. Blood irradiation therapy was repeated at this time. The patient returned September 3. Her general condition was apparently improved. Her asthmatic attacks were less severe than in the first four weeks following the initial blood irradiation, and she had gained 7 pounds. When she was next seen, on November 22, her general condition was fairly good, with her attacks steadily becoming less frequent and less severe.

Ultraviolet blood irradiation therapy was repeated on April 12, 1941, when the patient returned after a five month interval. Her condition was obviously greatly improved, her attacks were much reduced in number and severity and it was noted that cyanosis had

practically disappeared. The therapy was repeated June 9, Aug. 5, Oct. 10 and Nov. 25, 1941 and March 27, 1942. When last seen (April 27, 1942) the patient was having only one to three almost negligible attacks per month, her weight had risen from 102 to 122 pounds and her general condition permitted her to do all the work for a household of six as contrasted with her complete invalidism when she was first seen.

CASE 7. — Mrs. M. M., aged 56, was first seen Nov. 22, 1938. She gave a history of seventeen years of constant severe asthmatic attacks, with insomnia for the previous six years. The best types of treatment had been employed, notably desensitization to house dust, the only known predisposing etiologic factor, use of autogenous vaccine made from cultures of bronchial bacteria obtained by means of diathermy, the bronchoscope, sinus extirpation, inhalation and injection of various epinephrine and ephedrine preparations, and inhalation of the smoke of burning stramonium leaves. Despite these and other less well known procedures, the patient's general condition slowly but steadily deteriorated, so that when first seen she presented a characteristic picture of advanced intrinsic bronchial asthma, namely, constant, severe intractable asthma, marked and generalized cyanosis, insomnia, a definite inability to tolerate ephedrine or epinephrine in any form, moderate cachexia, 8 per cent eosinophilia, roentgenologic evidence of emphysema and, as might be expected, a psychoneurosis bordering on perpetual hysteria.

Ultraviolet blood irradiation therapy was administered on November 22, and the same night the patient experienced an aggravation of her asthmatic symptoms roughly equivalent to an average severe attack. However, the following day she improved slightly; this improvement continued steadily and four days after blood irradiation she was obviously somewhat better. Her attacks continued but were much milder.

A second blood irradiation was given December 7, with no aggravation of symptoms; only one attack occurred in the following week and she slept well all week. She continued to improve. Cyanosis began to disappear December 14; her general condition was greatly improved and she no longer smoked stramonium leaf cigarets at night.

Blood irradiation therapy was repeated on the following dates: Jan. 17, Feb. 17, March 20, April 21, June 26 and Oct. 20, 1939; Feb. 26 and Dec. 18, 1940; July 8, Sept. 8 and Oct. 15, 1941; Jan. 14, April 17, July 24 and Sept. 10, 1942.

Since June 26, 1939 this patient has been able to support herself and her husband by making and selling lace novelties. Her only severe recurrence was on July 7, 1941, following a seven month withdrawal of treatment; this gradually disappeared after three applications of ultraviolet blood irradiation therapy, and the patient today, three years and ten months after her first blood irradiation, is relatively free from attacks, has no cyanosis and is obviously greatly improved. Her recurrences are easily controlled by repetition of the therapy every three or four months.

CASE 21. — J. M., a man aged 21, was first seen Sept. 11, 1940 and gave a history of bronchial asthma of three years' duration following severe attacks of hay fever during this period. At this time he was suffering one to two moderate attacks per month despite desensitization efforts and roentgen ray treatment via the accessory nasal sinuses. Ultraviolet blood irradiation therapy was administered the same day, September 11. For the twenty-four and a half month period following this single blood irradiation, the patient experienced no attacks of asthma, as contrasted with one or two moderate attacks a month for the preceding three years. Moreover, he had no hay fevr.

General Results

The results observed are tabulated by individual cases in the accompanying Table and are presented graphically in figure 1. Figure 2 shows the chief etiologic types of intractable bronchial asthma.

As might be expected, there was considerable overlapping in etiologic agents, so that several cases are included in more than one etiologic type.

Analysis of the Table

A résumé of the table shows that of the 56 persons receiving adequate treatment and observation, 45 were definitely improved. Nine of these 45 were greatly improved and have maintained the improvement for more than one year; 20 were moderately improved and have maintained that improvement for over six months; 16 were improved but have been observed for less than six months. The 11 unimproved patients failed to show any change after adequate treatment and observation over a period of six to ten months.

In addition to these 56 patients, 24 did not receive sufficient treatment or

observation to permit any critical observation to be made. Of these 24, 19 have disappeared, 1 was definitely not improved over a three month period of treatment and 4 were definitely improved during an observation period varying from one to three months.

Results in Various Etiologic Types

As shown in figure 2, we have treated four chief etiologic types of intractable bronchial asthma, namely: I. Allergy to inhalants (pollen-dust). II. Allergy to bacterial infection (chronic accessory nasal sinusitis and chronic tracheobronchitis). III. Allergy to food. IV. Intrinsic and miscellaneous allergies.

Fifty-six of the 80 patients given ultraviolet blood irradiation therapy have been carefully observed over periods ranging from three months to three and one-half years.

I. Allergy to Inhalants (Pollen-Dust). — Of 20 inhalant-sensitive persons, there was found a definite sensitization in 7 to pollens alone, in 1 to dusts alone

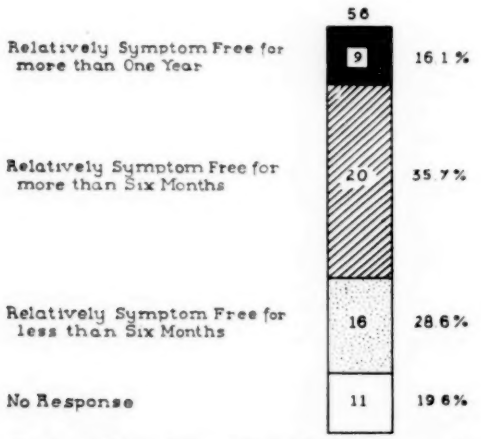

Fig. 1. — Composite total of results in all groups of intractable bronchial asthma following ultraviolet blood irradiation therapy (Knott technic).

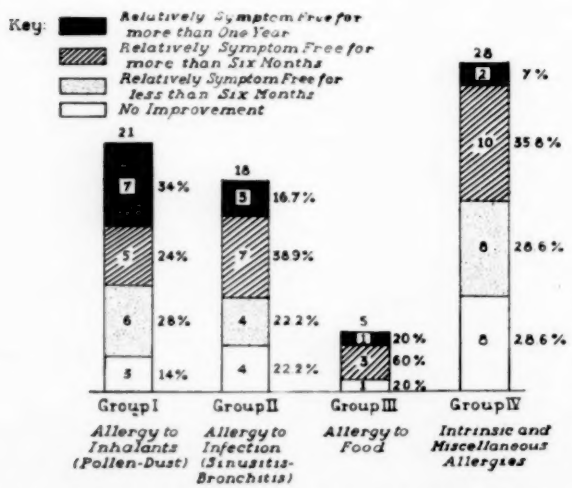

Fig. 2. — Results of ultraviolet blood irradiation therapy in various etiologic varieties of intractable bronchial asthma.

Summary of Cases *

Case No. and Patient's Name	Sex & Age Years	Duration of Disease Previous to Blood Irradiation, Years	Condition at Time of First Irradiation	No. of Irradiations	Mo. Under Treatment and Observation	Date of First Irradiation	Condition on 10/1/42	Result
1 F. V. R.	M 58	31	15-20 severe attacks monthly	6	35½	10/17/39	3-5 moderate attacks monthly	xx
2 G. U.	F 61	31	10-15 moderate attacks monthly	4	16¼	5/23/41	5-10 mild attacks monthly, general condition improved	x
3 D. E. S.	F 30	28	25-40 severe attacks monthly	4	41	5/ 1/39	1-2 mild attacks yearly	xxx
4 A. S.	F 46	26	Extreme emaciation and cyanosis, 40-50 severe attacks monthly	9	23½	5/17/40	1-3 mild attacks monthly, no cyanosis, 20 lb. increase in weight	xxx
5 B. C.	F 24	24	30-50 attacks monthly since infancy, marked cyanosis	4	14¾	7/11/41	Free of attacks 11 months, for first time in her life, aggravation last 6 weeks	xx
6 G. C.	M 49	19	30-50 attacks monthly	5	22½	11/12/40	1 mild attack monthly	xxx
7 M. M.	F 56	17	Severe asthma, insomnia for past 6 years, cyanosis	17	46	11/22/38	1-2 mild attacks monthly, no cyanosis, no insomnia, one seasonal aggravation	xxx
8 W. J.	M 50	15	15-20 severe attacks monthly associated with pansinusitis, cyanosis	8	30½	3/18/40	5-15 attacks a monthly, cyanosis	0
9 F. D.	F 30	15	20-30 attacks monthly	1	24¾	9/ 6/40	Unimproved	0
10 F. J.	M 30	15	1 severe attack, lasting 5 to 7 days, monthly	2	28½	5/17/40	Excellent, no monthly attacks	xxx
11 J. D.	F 14	11½	1 severe and 3-4 mild attacks monthly	6	11	11/15/41	No attacks as yet	xx
12 E. L.	F 54	11	30-50 severe attacks monthly	2	2	6/29/39	Not seen since	N.F.
13 R. M.	F 27	10	In oxygen tent owing to constant severe attacks (status asthmaticus)	2	2	9/ 9/40	Discharged improved, attacks easily controlled by inhalant spray (vaponephrin) up to time of discharge from hospital	N.F.X.
14 V. L.	F 42	8	Severe attack every 8-9 hours	4	11	11/18/41	5-7 mild attacks monthly	xx
15 A. S.	M 34	8	30-50 attacks monthly with constant insomnia	3	12½	9/13/41	Unchanged	0
16 C. D.	F 53	6	Two severe attacks in 3 months	3	11¼	10/20/41	No attacks	xx
17 C. S.	F 22	6	10-20 attacks monthly	14	13	8/30/41	No attacks in 11 months, seasonal aggravation in last 2 months	xx
18 A. G.	M 37	4	Constant wheezing, daily mild attacks	5	12½	11/13/40	Unchanged	N.F.
19 A. M.	F 41	6	Status asthmaticus	1	less than one	9/12/41	.....	N.F.
20 J. E.	F 43	4	Severe attacks during spring and fall despite desensitization	2	24½	9/14/40	Spring and fall attacks disappeared	xxx
21 J. M.	M 21	3	1-2 mild attacks monthly	1	24½	9/11/40	Complete absence of attacks since first irradiation	xxx
22 R. B.	M 14	2½	Severe monthly attacks at time of irradiation	1	11¾	10/10/41	Immediately relieved, no further attacks	xx
23 J. S.	M 49	5 mos.	Constant attacks, cough, dyspnea, bronchiectasis	3	27	7/ 5/40	No asthmatic attacks, cough or dyspnea	xx
24 J. A.	M 68	4	30-40 severe attacks; syphilitic heart disease	1	.....	1/ 6/42	.....	N.F.
25 A. D.	F 31	2 mos.	Severe constant attack for 2 months	4	12¼	9/22/41	Completely free of attacks	xxx
26 M. A.	F 36	2	20-30 severe attacks monthly	1	.....	9/18/40	.....	N.F.

* See page 539 for key.

*Summary of Cases**

	Case No. and Patient's Name	Sex & Age Years	Duration of Disease Previous to Blood Irradiation, Years	Condition at Time of First Irradiation	No. of Irradiations	Mo. Under Treatment and Observation	Date of First Irradiation	Condition on 10/1/42	Result
27	I. A.	F 56	10	20-30 moderately severe attacks monthly	4	3½	6/17/42	Somewhat improved	x
28	F. A.	M 46	39	Severe autumnal attacks	2	.....	7/24/40	.....	N.F.
29	L. B.	F 33	10	30-40 severe attacks monthly, paroxysmal coughing	10	10	12/ 1/41	No attacks for 3 months	xx
30	F. B.	M 43	2	Constant attacks plus chronic myocarditis	8	10½	11/14/41	Unchanged	0
31	E. C.	F 73	18	Status asthmaticus, 30-50 attacks monthly	5	8	1/20/42	No severe attacks	xx
32	A. C.	F 24	10	8-10 attacks monthly	1	8½	1/15/42	Improved	xx
33	H. D.	M 57	14	30-40 severe attacks monthly	3	6	12/19/41	Unchanged	0
34	R. D.	M 5	3	30-40 severe attacks monthly	3	3	6/26/42	Slight attacks	x
35	F. E.	M 61	2	30-40 severe attacks monthly	1	.....	2/ 3/42	.....	N.F.
36	F. E.	M 50	3	20-30 moderately severe attacks monthly	3	3	8/ 4/39	Unchanged	N.F.O.
37	A. E.	F 45	3	30-40 severe attacks monthly	2	2	2/ 6/40	Somewhat improved	N.F.
38	N. E.	M 30	1	One severe attack in year	1	.....	5/ 5/39	.....	N.F.
39	N. E.	F 21	8	Constant status asthmaticus	4	1½	4/15/41	Improved	N.F.X.
40	E. F.	M 44	5	30-40 attacks monthly	1	.....	3/18/42	.....	N.F.
41	N. F.	F 34	8	One severe attack a year	3	8	12/ 5/41	No attacks	xx
42	C. F.	M 72	6	30-40 attacks monthly	1	.....	3/ 4/42	.....	N.F.
43	M. F.	F 42	4	30-40 attacks monthly	2	1	2/ 8/39	.....	N.F.
44	J. F.	M 50	34	30-40 attacks monthly	3	6⅔	3/ 9/42	Improved	xx
45	W. F.	M 72	70	Intermittent severe attacks	5	4	12/30/41	Improved	x
46	A. G.	F 36	20	Severe attacks during summer	3	4	2/ 7/42	Improved	x
47	L. G.	M 56	3	Continued status asthmaticus, paroxysmal cough, cyanosis, despite epinephrine and oxygen	2	2	2/27/42	Rapid relief of symptoms following second irradiation	x
48	M. G.	M 32	7	Continued status asthmaticus	5	4	12/ 3/38	Disappearance of status asthmaticus	N.F.X.
49	A. G.	F 21	6	Severe summer asthma	1	.....	7/14/42	.....	N.F.
50	H. H.	F 31	7	Several light attacks monthly	1	.....	8/ 6/41	.....	N.F.
51	J. H.	M 57	8	30-40 severe attacks monthly	7	8	2/ 7/42	Unchanged	0
52	H. H.	F 65	27	Occasional attacks, seasonal aggravation	1	.....	1/ 7/42	.....	N.F.
53	A. H.	F 27	5	30-40 attacks monthly	8	8	1/ 9/42	5-10 mild attacks monthly	x
54	P. H.	F 31	2 mos.	10-15 moderate attacks monthly	7	9	12/10/41	No attacks	xx
55	L. J.	F 34	24	5-10 attacks monthly	6	8	1/28/42	No attacks	xx
56	R. K.	M 21	10	1 or 2 severe attacks monthly	2	24½	9/ 9/40	No attacks	xxx
57	A. K.	F 15	6	Frequent attacks, epinephrine fast	1	.....	3/13/39	.....	N.F.
58	H. K.	F 47	22	25-30 severe attacks monthly, status asthmaticus	11	11	11/11/41	No attacks	xx
59	A. L.	M 6	5½	30-40 severe attacks monthly	2	6	3/24/42	No attacks	N.F.X.

* See page 539 for key.

Summary of Cases *

Case No. and Patient's Name	Sex & Age Years	Duration of Disease Previous to Blood Irradiation, Years	Condition at Time of First Irradiation	No. of Irradiations	Mo. Under Treatment and Observation	Date of First Irradiation	Condition on 10/1/42	Result
60 A. L.	M 43	3	10-15 mild attacks monthly	3	3	6/27/42	One mild attack monthly	x
61 R. L.	F 7½	7	30 slight attacks monthly	5	10	12/ 6/41	No attacks	xx
62 E. L.	F 41	10	25-30 severe attacks monthly	8	8	2/ 6/42	No improvement	0
63 L. L.	F 22	4	30-40 severe attacks monthly	8	9	12/30/41	5-10 very mild attacks monthly	x
64 J. L.	M 31	3	25-30 moderate attacks monthly	8	10	11/26/41	Occasional attacks and mild wheezing	x
65 M. M.	F 40	4	30-40 severe attacks monthly	6	10	12/19/41	No attacks	xx
66 I. M.	F 49	15	30-40 severe attacks monthly	4	3	7/ 3/42	5-10 mild attacks	x
67 M. M.	F 35	29	Mild seasonal asthma	1	.....	9/ 9/40	.....	N.F.
68 L. M.	M 53	13	10-15 severe attacks monthly	9	9	12/27/41	Occasional mild attack	x
69 D. P.	F 20	3	Apparently moribund, status asthmaticus	6	8	2/ 7/42	4-5 mild attacks monthly	xx
70 N. P.	M 35	2	30-40 severe attacks monthly	7	9½	12/ 1/41	5-10 mild attacks monthly for 8 months, seasonal aggravation last 1½ months	x
71 J. R.	F 30	30	50-60 severe attacks monthly	5	10	11/26/41	No attacks	xx
72 V. S.	F 46	11 mos.	20-30 severe attacks monthly	4	7	3/11/42	Unimproved	0
73 E. S.	F 54	11	30-40 severe attacks monthly	2	.....	6/29/39	.....	N.F.
74 E. S.	M 14	6	30-40 severe attacks monthly	8	8	1/30/42	2-5 mild attacks monthly	x
75 M. S.	F 34	8	Constant status asthmaticus	4	3	7/13/42	Unimproved	0
76 W. S.	M 60	3	30-40 severe attacks monthly	2	.....	5/15/42	.....	N.F.
77 J. S.	M 23	10	Seasonal attacks	3	6	4/ 8/42	No attacks	x
78 S. V.	M 19	14	2-4 attacks monthly, 5-7 days each	8	9	12/19/41	1-2 mild short attacks for 7 months, acute seasonal aggravation for last 2 months	0
79 C. V.	M 59	5	Spring and fall attacks	2	4	6/16/42	Unimproved	0
80 J. Y.	M 13	13	30-40 severe attacks monthly	10	10	11/28/41	1-2 mild attacks monthly for 8 months, mild seasonal aggravation last 2 months	xx

* Key to Table:

		Summary	
Greatly improved	xxx	9	
Moderately improved	xx	20	45 improved
Slightly improved	x	16	
Unimproved	0	11	11 unimproved
Deteriorated	-----	0	
Not followed up			
Not followed up — no improvement noted during short observation period	N.F.	19	
	N.F.O.	1	24 not followed up
Not followed up — definite improvement noted during short observation period	N.F.X.	4	
Total		80	

NOTE: The greatly improved group includes only those patients in whom marked improvement has been maintained for more than one year; the moderately improved group, those maintaining definite improvement for more than six months, and the slightly improved group, those showing definite improvement of less than six months' duration.

and in 12 to both pollens and dusts. Five of the inhalant-sensitive patients were found to be afflicted also with chronic bronchitis and/or chronic sinusitis; 4 were also known to have food allergies and 7 were felt to have additional and extremely influential unknown etiologic factors.

Of the 20 patients sensitive to pollens and dusts, 6 (35 per cent) were found greatly improved for one year or more (xxx), 4 (20 per cent) for more than

six months (xx) and 6 (30 per cent) for less than six months (x), and 3 (15 per cent) were unimproved (0).

II. Allergy to Bacterial Infection (Chronic Accessory Nasal Sinusitis and Chronic Tracheobronchitis). — Eighteen of the 56 patients were found to be suffering from sensitization to bacterial infection in the form of chronic tracheobronchitis or chronic accessory nasal sinusitis. Of these, 5 were also pollen-dust asthmatics, 1 of the 5 being extremely allergic also to a large number of foods; in 3, further unexplained etiologic factors were felt to be of equal importance in the maintenance of the asthmatic status, 2 giving a history of extreme emotional upsets followed by acute tracheobronchitis, becoming chronic, and then by frequent severe asthmatic attacks; the asthma of these 2 was definitely psychosomatic in origin.

Of this group (16.7 per cent) were found to be greatly improved for more than one year, 7 (38.9 per cent) for more than six months and 4 (22.2 per cent) for less than six months, and 4 (2.2 per cent) were unimproved.

III. Allergy to Food. — Five of the 56 patients gave a history of allergy to food previous to the onset of asthmatic attacks; 4 later became pollen-dust sensitive; 1 of these also became afflicted with chronic bronchitis and sinusitis.

Of the 5 persons with food allergies, 1 (20 per cent) showed improvement for more than one year, and 3 (60 per cent) for more than six months, and 1 was unimproved.

IV. Intrinsic and Miscellaneous Allergies. — In 28 of the 56 patients, no satisfactory etiologic agent could be found to account for the persistent asthmatic attacks, and these have been considered due to unknown intrinsic causes. Actually, we feel that the asthma of all of the 56 patients could be considered of intrinsic origin at the time the patients were first seen, since removal or treatment of all known etiologic agents produced no alleviation whatever of the asthmatic symptoms.

Of the 28 patients with intrinsic and miscellaneous allergies, 2 (7 per cent) maintained improvement for more than one year, 10 (35.8 per cent) for more than six months and 8 (28.6 per cent for less than six months, and 8 (28.6 per cent) were unimproved.

All of the patients considered improved had continued the improvement up to the time of this survey, with no evidence of relapse.

Clinical Observations

1. During the first night after the initial blood irradiation a moderately severe asthmatic attack occurred, especially in patients with the obviously advanced type. Attacks occurred but infrequently and then mildly after subsequent blood irradiations.

2. Marked relief in the frequency and severity of the dyspneic attacks was noted after a second or third blood irradiation, given at intervals of three to six weeks after the initial treatment.

3. For the first year it was found advisable to administer ultraviolet blood irradiation therapy eight to twelve times at three to six week intervals.

4. After the first year the repetition of blood irradiation two to five times yearly was found necessary to keep the patient free from severe asthmatic attacks.

5. Cyanosis of many years' standing slowly disappeared within a year of initiation of ultraviolet blood irradiation therapy.

6. A marked and relatively permanent increase in the patient's general resistance was observed, so much so that many patients who have been under constant treatment have been enabled to lead apparently normal useful lives again with little or no discomfort.

7. A six month withdrawal of ultraviolet blood irradiation therapy, after

one and two years' use, respectively, in 2 cases resulted in a definite recurrence of moderately severe attacks of wheezy dyspnea. After irradiation was repeated, the symptoms again subsided, though apparently more slowly than originally.

8. The use of ephedrine or epinephrine inhalants was found to be necessary only rarely for the 45 patients in the improved group after the first three or four months of ultraviolet blood irradiation therapy.

9.. A complete absence of deleterious effects was noted.

Theoretical Considerations

Since it is obviously impossible to eliminate the psychosomatic effect of a new therapeutic agent on an asthmatic patient who has run the gamut of pseudoscientific therapeutic measures, we have not attempted the impossible; however, in order for a therapy to be judged as purely psychotherapy, it must be proved to have no therapeutic effect in any disease. But to any one who has seen apparently moribund patients, in the last stages of acute pyogenic infection, recover dramatically after ultraviolet blood irradiation therapy, a purely psychotherapeutic theory seems pitifully inadequate and wholly untenable. (We are sure that, if any of us had septicemia, we would prefer blood irradiation to the best psychosomatic treatment by the best psychiatrist.) Nevertheless, the psychic element cannot be ignored in the evolution of any new therapy used in a chronic debilitating disease; therefore we have tried to base our evaluation or criterion of improvement on the length of time that a patient's asthmatic symptoms have been controlled. If a patient is improved greatly for two months and then returns to his original asthmatic status, he is unchanged except for a temporary psychosomatic effect, an effect which characteristically wears off, as a rule, within a few months at the latest. If a patient has had intractable bronchial asthma for thirty-eight years plus insomnia for six years despite the best of medical care, and has little or no asthma, plus freedom from insomnia, for almost four years from the time she first is given ultraviolet blood irradiation therapy, she obviously has had much more than psychotherapy. If the same patient has had, unknown to her, a withdrawal of the therapy (by closing of the rotating shutter of the Knott hemoirradiator and cutting off the source of ultraviolet rays from the returning blood) and begins to show signs of severe asthma again, she is suffering from a true ultraviolet deprivation. If we next really give the patient ultraviolet blood irradiation therapy and her symptoms once more clear up, we feel that this is proof positive that such a patient — and there is such a patient (patient 7) — not only has been benefited by the ultraviolet irradiation of blood but has been suffering for years from severe ultraviolet deprivation, which apparently plays a much greater part in this disease, as well as others, than has been suspected.

Summary

Further preliminary study and clinical observations of the effects following ultraviolet blood irradiation therapy in patients suffering from intractable bronchial asthma have been tabulated. Of the 80 patients treated by this method, 45 were markedly improved, 11 were unimproved and 24 could not be followed up. Forty-five of the 56 who received constant treatment and careful observation were found to have definite relief of asthmatic symptoms.

Conclusion

1. A marked and relatively permanent alleviation of severe dyspnea and cyanosis plus an obvious increase in general resistance has been observed in a relatively large percentage of patients suffering from intractable bronchial asthma after the application of this method.

2. Blood irradiation therapy must be repeated at intervals of four to six weeks in cases of advanced asthmatic disease.

3. Six to ten months of treatment may be necessary before obvious improvement is noted.

4. Patients with advanced and severe intractable bronchial asthma cannot expect a permanent alleviation of symptoms but often can be relieved of them consistently under constant treatment.

5. Patients with early intractable bronchial asthma respond more rapidly and maintain their improvement for longer periods than do those in an advanced stage.

6. Intractable bronchial asthma requires, in addition to ultraviolet blood irradiation therapy, adherence to certain fundamental principles; e. g., elimination of predisposing aggravating influences, avoidance of instrumentation and nasal operations and temporary use of epinephrine inhalants.

7. Autumnal aggravation of asthmatic symptoms occurred in approximately 30 per cent of all patients under treatment but was a purely temporary type of recurrence.

8. The Knott technic has been found by us to be a safe and efficient method of controlling intractable bronchial asthma in 45 of 56 patients who received constant treatment and observation.

References

1. Rebbeck, E. W.: Ultraviolet Irradiation of Auto-Transfused Blood in the Treatment of Acute Peritonitis, Hahneman. Monthly **77**:288, 1941.

2. ————: Ultraviolet Irradiation of Auto-Transfused Blood in the Treatment of Puerperal Sepsis, Am. J. Surg. **54**:691, 1941.

3. ————: Ultraviolet Irradiation of Auto-Transfused Blood in the Treatment of Acute Appendiceal Perforation with Abscess Formation, Hahneman. Monthly **77**:147, 1942.

4. ————: Ultraviolet Irradiation of Auto-Tranfused Blood in the Treatment of Postabortional Sepsis, Am. J. Surg. **55**:476, 1942.

5. ————, and Walter, R. A.: Double Septicemia Following Prostatectomy Treated by the Knott Technic of Ultraviolet Blood Irradiation, Am. J. Surg. **57**:536, 1942.

6. ————,and Miley, G.: The Knott Technic of Ultraviolet Blood Irradiation as a Control of Infection in Peritonitis, Rev. Gastroenterol. Jan.-Feb., 1943.

7. Hancock, V. K., and Knott, E. K.: Irradiated Blood Transfusion in Treatment of Infections, Northwest Med. **33**:200, 1934.

8. Hancock, V. K.: The Treatment of Blood Stream Infections with Hemo-Irradiation, Case Reports, Am. J. Surg. **58**:336, 1942.

9. Barrett, H. A.: The Irradiation of Auto-Transfused Blood by Ultraviolet Spectral Energy. Results of Therapy in 110 Cases, M. Clin. North America **24**:723, 1940.

10. ————, and Cinelli, Albert A.: Syndrome of the Posterior Inferior Cerebellar Artery, Arch. Otolaryng. **108** (July) 1942.

11. ————: Five Years' Experience with Hemo-Irradiation According to the Knott Technic, Am. J. Surg. **61**:42 (July) 1943.

12. Miley, G.: The Ultraviolet Irradiation of Auto-Transfused Blood: Studies in Oxygen Absorption Values, Am. J. M. Sc. **197**:873, 1939.

13. ————: Ultraviolet Blood Irradiation Therapy in Acute Pyogenic Infections at Hahnemann Hospital, Hahneman. Monthly **75**:977, 1940.

14. ————: A Method of Irradiating Circulating Blood in Vitro with Ultraviolet Spectral Energy; Studies of Its Physiological Effects in Vivo Application in Humans, Proc. Am. Physiol. Soc. **76**:200, 1941.

15. ————: The Knott Technic of Ultraviolet Blood Irradiation in Acute Pyogenic Infections, New York State J. Med. **42**:38, 1942.

16. ————: Ultraviolet Blood Irradiation Therapy, Arch. Phys. Therapy **23**:536, 1942.

17. ————: Ultraviolet Blood Irradiation Therapy, (Knott Technic) In Acute Pyogenic Infections, Am. J. Surg. **57**:493, 1942.

18. ————: The Control of Acute Thrombophlebitis with Ultraviolet Blood Irradiation Therapy, Am. J. Surg. **60**:354, 1943.

(Continued on page 562)

TEACHING OF PHYSICAL MEDICINE IN RELATION TO THE WAR EFFORT *

FRANK H. KRUSEN, M.D.

and

EARL C. ELKINS, M.D.

ROCHESTER, MINN.

There is no question concerning the extreme need for a well organized plan of physical rehabilitation in the military organization of this nation in time of war. One of us (F. H. K.) has stressed this point in previous communications,[1] and recently Coulter and Carter[2] stated, "Physical therapy has proved a necessary adjunct to medical and surgical treatment in the rehabilitation of injured persons." In conjunction with the enormous expansion of the medical military organization in this war it has become essential that the program for training of personnel, both medical and technical, to staff governmental departments of physical therapy be greatly expanded.

Adequate facilities for the physical treatment of patients are necessary in peacetime, and they become even more essential in wartime. For example, at one large civilian institution (our own clinic), approximately a twelfth of all the patients seen are referred to the section on physical therapy. But we are told that in the huge military hospital at Washington, D. C., the Walter Reed General Hospital, a fifth of all the patients are referred to the department of physical therapy. Any department which is employed so extensively should be staffed by highly skilled physicians and by well trained technical aids. During the world War of 1914 to 1918 it was estimated that 50,000 to 75,000 patients referred for reconstruction would be received per year from each 1,000,000 men overseas, and by June, 1919, there were forty-five medical officers, fifty-four enlisted men and seven hundred reconstruction aids devoting their time to physical therapy.[3]

Need for Trained Physical Therapy Physicians and Technical Aids

In this war because of the progress of medical science and because of the greater scope of the military effort, the need for physicians and technical aids trained in physical therapy will far exceed that of the last war. If an adequate program of teaching is to be provided for such personnel, an attempt must be made to compute this need.

Number of Physical Therapy Physicians Required

In estimating the number of physicians trained in physical therapy who will be required for the present war effort, one must begin immediately with the premise that every military physical therapy department must be under direct medical supervision. Because physical medicine is employed so extensively in war medicine, this dictum cannot be impressed too strongly on the minds of medical military executives. One would not think of conducting a military or civilian department of roentgenology of a clinical laboratory without adequate direct medical supervision by a trained physician. It is equally important that each department of physical therapy be similarly conducted.

* From the Section on Physical Medicine, the Mayo Clinic.
* Read at the twentieth annual meeting of the American Academy of Physical Medicine, Boston, Oct. 14, 1942.
* Reprinted with permission, *War Med.* **3**:367 (April) 1943.

Departments of roentgenology and clinical laboratories also employ technical aids, but no matter how highly skilled these technical aids may be, they are rarely, if ever, permitted to work without adequate medical supervision. Likewise, even the most skilled physical therapy aid should not be permitted to function without direct medical supervision. No technical aid is ever trained in all of the complexities of medical diagnosis, hence no technical aid is ever completely capable of conferring with referring physicians and discussing intelligently all the possibilities of physical treatment.

With these thoughts in mind to begin with, we are forced to conclude that just as every department of roentgenology will have its own medical officer, so must every department of physical therapy have its own medical officer in wartime. We may then conclude that every general hospital and every station hospital which is large enough to have a department of physical therapy should have at least one trained physical therapy physician in charge of all physical treatment.

In 1940 it was stated by Coulter[4] that "an estimate of 300 general hospitals of 1,000 beds each for six field armies in a war of such severity as is occurring in Europe would not seem to be excessive." Obviously we are immediately confronted with the fact that we shall need three hundred physical therapy physicians to staff these three hundred general hospitals. In addition, each station hospital which is large enough to have a department of physical therapy should have the department under direct medical supervision. Likewise, each expenditionary hospital should have a physical therapy physician to direct its department. Furthermore, all of the Navy hospitals which have a department of physical therapy should have a physician in charge.

Army tables of organization already specify the number of physical therapy aids to be provided for each general hospital (seven technical aids) and for each expeditionary hospital (four technical aids), but at the moment these tables do not take into consideration the important fact that in every instance these aids should have a physician to direct their activities, to prescribe proper treatment and to give consultation concerning physical therapeutic management. The Navy Bureau of Medicine and Surgery estimated last May that it would need fifty physicians trained in physical medicine before July 1, 1943. Apparently, however, it has revised this estimate recently, because a few weeks ago the Bureau decided to train twenty additional Navy medical officers in physical therapy and fever therapy.

Although it is obvious that no definite figures can be published at this time concerning the number of physical therapy physicians required for the present military effort, it is also apparent that more than 400 such physicians will be needed in order to provide an ideal situation in all military hospitals. Because of the fact that there is every evidence that the Surgeon General of the Army and Navy are providing facilities for the care of the military sick and wounded which equal or even surpass the facilities in civilian hospitals, there is every reason to believe that the most satisfactory arrangement will be sought by them. Therefore, to provide an adequate program of teaching, one must be prepared to train enough medical officers to make up the difference between the number available and the number who will be needed.

Number of Trained Physical Therapy Physicians Available for Military Service

More than a year ago the Subcommittee on Physical Therapy of the National Research Council estimated that there were less than one hundred

qualified physical therapy physicians who could be spared from civilian practice. Many of the qualified men are over age, are needed as teachers or are physically incapable of being accepted for military service. At the present moment, there are perhaps twenty-five men fully qualified in physical therapy in the Navy Medical Corps and about fifty qualified physical therapy physicians in the Army Medical Corps.

Recognizing the need for expanding the program for training of Army medical officers in physical therapy, in January, 1942, the Army started sending medical officers to the section on physical therapy at the Mayo Clinic each quarter for a twelve week course in physical medicine. Already thirty-three officers have been trained or are under training at this center and arrangements have been made to train thirty-two more during the first six months of 1943. It is fully recognized by all concerned that it is impossible to make a specialist in physical medicine in three months. Therefore, it is imperative that every medical specialist in physical therapy who is or can be made available should enter service with the armed forces. While these three month courses for Army officers cannot be expected to qualify them as polished specialists, nevertheless, such courses can qualify a medical officer to direct a department of physical therapy in an Army hospital.

After careful and prolonged consideration the Subcommittee on Physical Therapy of the National Research Council concluded that three month courses offered at key centers would best solve the needs of the Army Medical Corps in the present offensive effort. It was agreed that a six month course would be even better, but present War Department regulations and the stress of the present emergency prevent the offering of courses longer than three months. We can say, then, that by the end of this year there will be in the Army perhaps seventy-five men who have had three or more months of specialized training in physical therapy.

The Bureau of Medicine and Surgery of the Navy has recently announced that it is planning to send twenty medical officers to the section on physical therapy at the Mayo Clinic for six months' training in physical therapy and fever therapy. Seven of these men have already been assigned, and more will no doubt follow, so that early in 1943 the Navy should have about forty-five medical officers qualified to direct hospital departments of physical therapy.

We may conclude, then, that by June, 1943, somewhere in the neighborhood of one hundred and fifty medical officers will be on active duty in military physical therapy departments. This will indicate considerable progress in meeting the need but will be far from reaching the probable eventual requirement for more than four hundred such physicians.

Facilities for Training Medical Officers in Physical Medicine

At present the Army and Navy are utilizing only one civilian training center for the teaching of medical officers in physical medicine. This is the center at the Mayo Clinic. However, the Subcommittee on Physical Therapy of the National Research Council has recommended that four other centers be utilized for such training, and such expansion of the training effort would be highly desirable. These four additional centers which have volunteered their facilities are in the physical therapy departments at Cornell Medical Center, New York, under Dr. K. G. Hansson; the Cleveland Clinic, under Dr. Walter Zeiter; Northwestern University Medical School, Chicago, under Dr. J. S. Coulter, and Barnes Hospital (Washington University Medical School), St. Louis, under Dr. Frank Ewerhardt.

Perhaps these centers will be utilized in the near future for training

medical officers, and perhaps too, other centers will be established before long. It is apparent that the various physical therapy centers are extremely anxious to assist to the utmost in the training of an adequate number of physical therapy physicians for the military services.

Number of Physical Therapy Technical Aids Required

In September, 1942, Coulter and Carter reported:

The Subcommittee on Physical Therapy of the National Research Council in a recent survey found the following demand for physical therapy technicians in the immediate future:

Bureau of Medicine and Surgery, United States Navy	0*
United States Public Health Service	14
United States Veterans' Administration	70
Civilians (Perrott and Dorn[5])	292
United States Army Medical Corps	778
Demand total	1,154

This can be considered as the actual demand for trained physical therapy technical aids at this time.

Often the demand is not so great as the need, and Coulter and Carter concluded that the need was even greater than the demand. They made a careful estimate of the actual need for such technical personnel, and according to their estimates, there will eventually be a need which far exceeds the present demand. They tabulated needs as follows:

United States Army General Hospitals	2,160
Civilian hospitals	1,584
Crippled children's schools	1,682
Children's Bureau, United States Department of Labor	710
Total	6,076

It was concluded that "the quantitative estimate of the need as given cannot be regarded as an immediate practical objective or as a rigid standard by which to judge the adequacy of local medical facilities," but the article does serve to indicate that the need for such technical help is extremely great and probably is considerably greater than the present demand. These figures prove that there is a great official demand for physical therapy technical aids and a still greater need. As is the case with physicians, a teaching program must be developed which will make up the difference between the number of technical aids needed and the number now available.

Number of Trained Physical Therapy Technical Aids Available for Military Service

At present there are in this country only about one thousand, six hundred qualified physical therapy technicians to take care of civilian needs. There was a shortage of such workers prior to the war, and since the attack on Pearl Harbor the need for trained technicians in physical therapy has become extremely acute. Recent official communications from the Army indicate the seriousness of the situation. For example, in a recent letter appeared the following statement: "With the great expansion of the Army and the paucity of the required number of physical therapy aids, something must be done and must be done immediately." Another official letter mentions the "dire shortage of trained girls for this immense effort."

Therefore, it is imperative that facilities should be provided to meet

* Since publication of these estimates the Navy has recently changed its computations and has issued an urgent call for female physical therapy technicians to enlist in the Hospital Corps, Women's Reserve. This will increase the demand for technicians still more.

this dire shortage and that properly qualified persons should be persuaded to avail themselves of these facilities.

Facilities for Training Physical Therapy Technical Aids

Vigorous efforts have been made to enlarge the facilities for training physical therapy technicians. Two years ago there were only sixteen approved schools for training such technicians. Now there are twenty approved schools; four additional (two Army and two civilian) schools have been organized under satisfactory auspices, and these undoubtedly will be approved also. So there are now twenty-four satisfactory schools for training of physical therapy technicians (fig. 1). Furthermore, twelve of the approved schools have established special emergency training courses to meet the expanding needs of the military services. Also, the Army is contemplating the establishment of several branch schools for physical therapy aids, in addition to the two already organized as extensions of the central school at the Walter Reed General Hospital. These branch schools, if established, will be situated in various Army general hospitals.

A list of sixteen approved schools for physical therapy technicians will be found in The Journal of the American Medical Association for March 28, 1942.[6] Since March 28 one school, the Posse Institute, at Kendall Green, Mass., has been closed; three schools (at the College of Medical Evangelists, Los Angeles, Medical Director, Dr. Fred B. Moor, Barnes Hospital [Washington University Medical School], St. Louis, Medical Director, Dr. Frank H. Ewerhardt, and New York University, New York, Medical Director, Dr. William Bierman) have been approved, and finally, on November 9 two more schools (at the Cleveland Clinic, Cleveland, Medical Director, Dr. Walter Zeiter, and the University of California Hospital, San Francisco, Medical Director, Dr. Frances Baker) were approved. This makes a total of twenty approved schools as of November 8. Also there are two new civilian schools (at Iowa University, Iowa City, Ia., under the medical directorship of Dr. W. D. Paul, and Columbia University, Department of Physical Therapy, Presbyterian Hospital, New York, under the medical direction of Dr. William B. Snow) and two new Army schools (at Fitzsimons Hospital, Denver, under the medical directorship of Major O. Leonard Huddleston, and Army and Navy General Hospital, Hot Springs, Ark., which we understand is under the medical directorship of Capt. W. Jerome Lee).

These twenty-four schools now have a capacity of more than seven hundred students, but according to the last report from the Council on Medical Education and Hospitals of the American Medical Association, there were enrolled in these schools only two hundred and thirty-two students. Facilities for training students are now comparatively adequate, and there seems to be little need for the establishment of additional schools at this time. The great problem at the moment is to obtain sufficient students to fill the vacancies in the schools. It must be stressed that the need now is not for more training schools but for an adequate number of students to fill these training schools. The approved schools for physical therapy technicians have conformed to the specifications of the American Medical Association on "essentials of an acceptable school."[7] If standards are to be maintained, it will be necessary that any new schools which are organized shall conform to these standards, and we believe that every physician interested in physical therapy hopes that the standards among the technical personnel will never be lowered, even during the stress of the war emergency.

Up to this time the office of the Surgeon General of the Army has adhered rigidly to high standards, and there is every reason to believe that

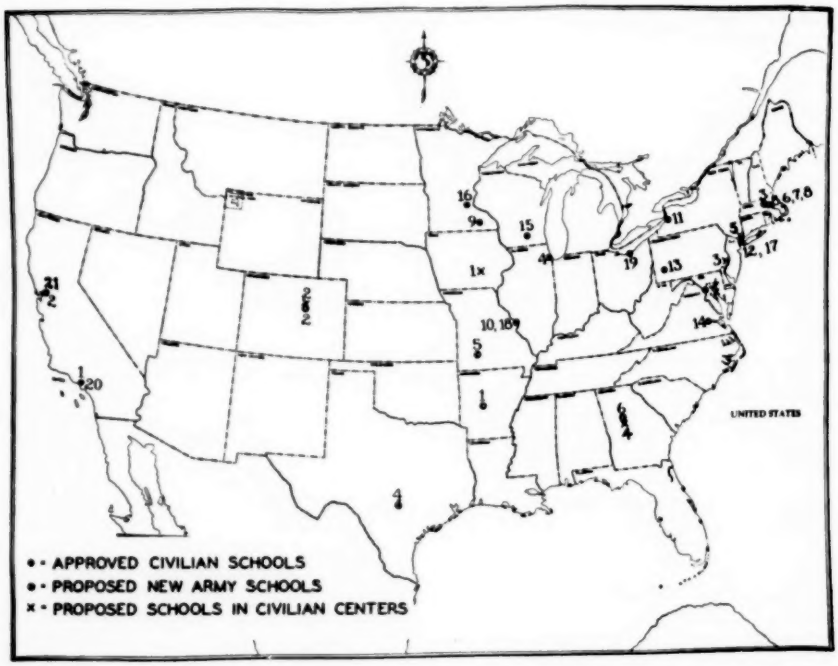

Fig. 1. — Schools for physical therapy technicians. Approved schools, with their locations, include: (1) Children's Hospital,[1] Los Angeles; (2) Stanford University School of Medicine,[1] San Francisco; (3) Walter Reed General Hospital,[1] Washington, D. C.; (4) Northwestern University Medical School,[1] Chicago; (5) Bouvé-Boston School of Physical Education,[1] Boston; (6) Harvard Medical School,[1] Boston; (7) Boston University, Sargent College of Physical Education,[1] Boston; (8) Posse Institute,[2] Kendal Green, Mass.; (9) Mayo Clinic,[1] Rochester, Minn.; (10) St. Louis University School of Nursing, St. Louis; (11) University of Buffalo School of Nursing,[1] Buffalo; (12) Hospital for Special Surgery,[1] New York; (13) D. T. Watson School of Physiotherapy,[1] Leetsdale, Pa.; (14) College of William and Mary, Richmond, Va.; (15) University of Wisconsin Medical School,[1] Madison, Wis.; (16) University of Minnesota Medical School, Minneapolis; (17) New York University Medical School, New York; (18) Barnes Hospital (Washington University Medical School), St. Louis; (19) Cleveland Clinic,[3] Cleveland; (20) College of Medical Evangelists, Los Angeles, and (21) University of California Hospital,[3] Los Angeles.

Proposed Army schools include ones at (1) Army and Navy General Hospital,[4] Hot Springs, Ark.; (2) Fitzsimons General Hospital,[4] Denver; (3) Lovell General Hospital, Fort Devens, Mass.; (4) Station Hospital, Fort Sam Houston, Texas; (5) O'Reilly General Hospital, Springfield, Mo., and (6) Lawson General Hospital, Atlanta, Ga.

Proposed schools in civilian centers[5] include ones at (1) State University of Iowa,[6] Iowa City, Iowa; (2) University of Colorado, Denver; (3) University of Pennsylvania, Philadelphia; (4) Emory University, Atlanta, Ga., and (5) Columbia University,[5] New York.

1. An emergency course is being offered at this school.
2. This school discontinued its course March 28, 1942.
3. This school was approved on Nov. 8, 1942.
4. A course has been inaugurated recently at this school.
5. In addition to the schools listed here we have recently learned that an attempt is being made to organize an approved school at Indiana University, under the supervision of Dr. E. N. Kime.
6. This school started a course this fall.

it will continue to do so and, if it is decided to organize additional new Army schools, that they will be kept up to the usual high standard. The Army will accept as physical therapy aids in its military hospitals only such persons as have graduated from an approved course and as have previously fulfilled the requirements for admission to such a school. These requirements are (1) graduation from an accredited school of nursing, (2) graduation from an accredited school of physical education or (3) completion of two years or sixty semester hours of collage work including courses in physics and biology.*

Unfortunately, the Navy has not yet reached the same high standard for training its personnel in physical therapy, and it is hoped that it will gradually raise its standards to equal those for technical personnel in civ-

* This requirement was altered on Nov. 8, 1942, to read "two years or sixty semester hours of college work including satisfactory courses in biology and other sciences."

ilian hospitals and Army hospitals. It has been the practice in the Navy to train corps men as technical aids, and it is said that the facilities of the Medical Department of the Navy are such that these hospital corps men are being given instruction in all of the major naval Hospitals in physical therapy technic leading to the designation of "technician, physical therapy." **

Whereas a minimum of one thousand, one hundred hours is given in emergency courses in civilian and in Army schools and this one thousand, one hundred hour didactic course is followed by six months of apprentice training in practical work, in the Navy at present the courses are much shorter. At one Naval hospital the length of the course for training corps men in physical therapy technic is only two months, and during this period only two hours a day is devoted to didactic instruction and five hours a day to practice. Even in the present emergency such a course seems inadequate for proper training of technical personnel, and undoubtedly the Navy Department will improve this training in the near future.

Already the Army is being tempted in the stress of the present emergency to emulate the Navy and train some of its enlisted men in a similar fashion. It is sincerely to be hoped that the Army will not succumb to this temptation, but will continue to maintain its standards and that the Navy will continue to improve its plan of training for physical therapy technicians in Navy hospitals.

As matters now stand, the Navy's plan for training medical officers in six month courses is superior to the Army's plan of training Army officers in three month courses, and the Army's plan for training technical aids is superior to the Navy's plan for teaching technical aids. It must be remembered that with the tremendous expansion of military personnel, slight inconsistencies in plans for training such personnel are bound to exist. The amazing fact is that so much has been accomplished in so short a time, and there is every reason to expect that the programs for teaching personnel will continue to improve rapidly.

Prerequisites for Entrance Into a Course for Training Physical Therapy Technical Aids

The persons who enter a physical therapy technical training course should be selected with considerable care, and during wartime consideration must be given to the fact that persons with the proper preliminary training may also be needed in other fields. Although the Council on Medical Education and Hospitals of the American Medical Association has specified that nurses, physical education graduates or persons who have had a minimum of two years of college including training in biology and other sciences are eligible for admission to such a course, it is apparent that some of these persons may be needed in other fields. The necessity for

** Until recently the Navy was employing men almost exclusively to serve as physical therapy technicians in the Hospital Corps, but about Nov. 20, 1942, we learned that the Navy had issued an urgent call for women to enlist as physical therapy technicians in the Hospital Corps, Women's Reserve, United States Naval Reserve. But the stated specific requirements for enlistment of these women as physical therapy technicians in the Navy Hospital Corps do not conform to the standards set for civilian and for Army hospitals.

In a bulletin which was brought to our attention on November 20 these "specific requirements" for enlistment of physical therapy technicians and certain other types of technicians (clinical laboratory, dental, roentgen and occupational therapy technicians) were listed as follows: "1. Completion of the prescribed course of study in one of the enumerated specialties in an accredited school, hospital or laboratory. In addition applicants must have had at least one year practical experience in their specialty, or: 2. High School diploma and not less than 3 years full time practical experience in one of the [enumerated] specialties."

Insofar as physical therapy technicians are concerned, the supply of those who could comply with requirement 1 has been exhausted long ago and those who could comply with requirement 2 would not follow any existing approved training pattern. They would not be required to have the usually accepted preliminary college or nurses' training, and they would not be required to graduate from an approved school for physical therapy technicians.

It seems obvious that these requirements should be altered to conform to the standards set by civilian and by Army hospitals.

having a sufficient supply of nurses to enter the Army and the Navy Nursing Corps is now so great that it is our belief that graduate nurses should enter these corps rather than attempt to prepare themselves to become physical therapy technical aids. Therefore, it seems advisable to attempt to draw the students for the physical therapy technical courses from the college groups which have been mentioned.

A peculiar situation has developed because of the fact that until recently the Navy Medical Corps has expressed its preference for male physical therapy technical aids who serve as corps men, while recently the Army has stated that it preferred women to serve as physical therapy technical aids. At present in the Navy the technical aids are on an enlisted status, and in the Army the technical aids are on a civilian status, being appointed to the various Army hospitals through the Civil Service Commission.*

Whereas in February, 1941, the office of the Surgeon General of the Army announced that "the position of physical therapy aide in the Medical Department of the United States Army is available to either men or women," in September, 1941, the War Department decided "to encourage its employees to respond to orders to active military duty" and to release its male civilian employees for active service in other fields. It was at this time that the office of the Surgeon General of the Army decided that it would prefer only female physical therapy aids in Army hospitals.

Recently, however, a plan has been set up so that men who are trained as physical therapy aids and who enlist in the Army can be assigned as members of the enlisted personnel to Army hospitals, and it has been announced by the American Red Cross "at the request of the Surgeon General of the Army" that men who meet the required standards will be enlisted and assigned to the Medical Department.

Under existing regulations (or requirements or statutes), all selectees and enlistees are put (or placed) in the grade of private and undergo a period of basic military training. Subsequently, technologists (or men) are assigned to units and may be subject to promotion to non-commissioned grade or to specialist ratings commensurate with the duties performed and the ability of the individual to accept responsibility and within the vacancies in grades and rating available under funds allotted.

The American Red Cross has also announced that "male technologists will be eligible for enlistment in the Army as non-commissioned officers, in the grades of sergeant, staff sergeant, or technical sergeant." In September, 1942, the office of the Surgeon General pointed out that "it should be understood that a non-commissioned rank is not mandatory for these individuals, but is left to the jurisdiction of the commanding officer." At the present moment trained male physical therapy technical aids can enlist in the Army and at the discretion of the commanding officer can be advanced to noncommissioned ranks, but there is no plan for giving these college graduates with special training any commissioned rank in the Army Medical Corps.

A similar situation existed until recently in the Navy, and physical therapy technical aides were accepted as second class pharmacist's mates, but within the past few weeks the Bureau of Medicine and Surgery of the Navy has announced that hospital corps men with special technical training will have an opportunity now to advance to commissioned rank. Such commissions will be temporary for the duration of the war and will be open in the grades of ensign, lieutenant junior grade and lieutenant.

* There is now before Congress a bill, known as the Edmiston bill, "which will grant commissions to physical therapy aides and dietitians in Army hospitals." A letter which we received from Congressman August H. Andresen, dated Nov. 18, 1942, stated: "The bill has been considered by the Military Affairs Committee, and at the recommendation of the War Department it was reported to the House for consideration. It appears that the legislation will receive favorable consideration."

It now becomes apparent that a mechanism has been set up both in the Army and in the Navy which will permit male graduates of schools for physical therapy technical aids to enlist and then be assigned to the Medical Department with the opportunity of obtaining a noncommissioned grade, and in the Navy there is even a possibility for the men to advance to a temporary commissioned grade. This will take care of the problem of the male technician already trained in civilian schools. In the future, however, because the Navy trains its own corps men and because the Army prefers female physical therapy aids, it would seem advisable that the civilian schools should accept only women in their emergency military courses. Furthermore, because of the shortage of nurses women who are graduates in physical education or who have had the minimal college training rather than nurses should be encouraged to enter these schools.

Need for Trained Occupational Therapy Technical Aids

Closely allied to physical therapy in the rehabilitation program is occupational therapy. In general, it seems to be a good principle to have the medical officer who is in charge of physical therapy supervise the work in occupational therapy, and trained occupational therapy aids should be employed to work in close conjunction with the physical therapy aids in rehabilitation of wounded personnel. This plan was followed during the last war and should be followed again during this war.

Space does not permit a detailed discussion of this phase of the problem, but it should be understood that there are several schools which are approved for occupational therapy technicians and there is a well organized group of such aids who are fully prepared to assist in the war effort. The American Occupational Therapy Association has a special committee which is dealing with the war problem and which is being operated under the able leadership of Mrs. Winifred Kahmann, of Riley Hospital for Crippled Children, Indianapolis. The course for teaching of physical therapy physicians and physical therapy technical aids should include an exposition of the important relations between physical therapy and occupational therapy in the management of war disabilities.

Details of Organization of a Wartime Emergency Course for Physical Therapy Physicians

A wartime emergency course in physical therapy for physicians should last for a minimum of three months and preferably should be six months in length. In general, the program for training in physical medicine should be designed to equip medical officers to direct a department of physical therapy. Special emphasis should be placed on the physical treatment of diseases commonly encountered in military practice.

Detailed information concerning the medical application of light and of heat (including fever therapy), hydrotherapy, electrotherapy and mechanotherapy (including massage and exercise) should be provided. The employment of physical agents for diagnostic purposes (including muscle testing and electrical testing for reaction of degeneration) should also be included. Careful consideration should be given to the subject of administration of a hospital department of physical therapy. Didactic lectures, seminars and practice hours should be scheduled. A list of textbooks and books for collateral reading should be provided, and library facilities should be made available.

It is well to include with the course a series of lectures dealing with subjects which are of general interest to all military physicians. Special

attention should be paid to refresher courses in the fundamental subjects of anatomy, physics and kinesiology. Furthermore, emphasis should be laid on the physical therapeutic management of certain disabling conditions commonly met with in military practice. These include burns, fractures, wounds, amputations, peripheral nerve injuries, backache and foot disabilities.

Peripheral nerve injuries, for example, are extremely common in military practice, and McCormick has pointed out that during the last war such lesions were prevalent, so that

> . . . on May 1, 1919, there were 2,347 patients with peripheral nerve lesions in the United States military hospitals. Of these 147 had lesions of the brachial plexus, 589 of the ulnar nerve, 529 of the radial nerve, 433 of the median nerve, 349 of the sciatic nerve, and 283 of other external nerves.

With regard to physical therapy courses in general, a communication from the physical therapy department of the Walter Reed General Hospital, at Washington, D. C., pointed out that in wartime special attention should be given to

> . . . (1) theory and practice in the treatment of peripheral nerve injuries; i. e., muscle testing, reeducational exercise. (2) orthopedic conditions in general; fractures specifically (a) bandaging, (b) removal of splints and braces for treatment and their reapplication.

The comment was made that "orthopedic patients represent a large percentage of the patients treated in Army hospitals and as the war continues the percentage of this group of patients will probably be higher."

One of us (F. H. K.) has previously stated:

> The lesion amenable to physical treatment most often encountered in military medicine may be divided roughly into two large groups: (1) trauma of bones and joints, including fractures, dislocations, stiff joints, bone grafts and traumatic arthritis, and (2) trauma of soft tissues, including scars (especially of amputation stumps), contusions and lacerations of muscles and tendons, postural strains (particularly backache and flatfoot), paralysis and tendon transplantations.

Special attention, then, should be devoted to the physical therapeutic management of such lesions. Furthermore, as has been mentioned, special attention should be devoted to the relation of occupational therapy to physical therapy. And, finally, detailed information concerning the treatment of sulfonamide-resistant gonorrhea by artificial physical fever should be considered in detail.

In August, 1942, the office of the Surgeon General of the Army announced that "for patients suffering from sulfonamide-resistant gonorrheal infections hyperpyrexia appears to be the most effective form of therapy." In addition, it has been announced that the named* general hospitals, in contradistinction to the numbered general hospitals, will be equipped to give fever therapy. In most instances, the officer in charge of physical therapy will be responsible for the administration of the physical fevers. The Navy, also, is offering the combined training in physical therapy and fever therapy for its medical officers.

If a six month course is given to military physicians, according to the plan that we are now following in the training of Navy medical officers, then much more time can be devoted to actual practice, in order that the physicians may become familiar with the proper method of prescribing physical treatment for patients and much more information can be obtained concerning the practical details of the management of a physical therapy department.

* Named general hospitals bear such designations as "Walter Reed General Hospital" and "Fitzsimons General Hospital." The numbered hospitals are designated only by numerals.

Details of Organization of a Wartime Emergency Course for Physical Therapy Technical Aids

After conferences with representatives of the office of the Surgeon General of the Army, the office of the Surgeon General of the Navy and the Council on Medical Education and Hospitals of the American Medical Association, Dr. John S. Coulter, of Northwestern University, Chairman of the Subcommittee on Physical Therapy of the National Research Council, and one of us (F. H. K.), Secretary of this subcommittee, formulated the following curriculum for emergency courses for Army physical therapy aids:

*Curriculum for Six Month Emergency Course During the Present National Emergency, Course to Be Offered Twice Yearly**

Subject	No. of Hours	Hours of Theory	Hours of Laboratory and Practice
Anatomy	200	25	175
Bacteriology	5	5	.....
Bandaging	10	10	.....
Chemistry	25	25	.....
Electrotherapy	70	25	45
Ethics and administration	5	5	.....
Fever therapy	30	10	20
Hydrotherapy	25	10	15
Massage	60	15	45
Occupational therapy	5	5	.....
Pathology	25	25	.....
Patient practice	275	.....	275
Physics	25	25	.....
Physiology	25	25	.....
Principles of apparatus	10	10	.....
Principles of physical therapy, as applied to:			
Medicine	45	15	30
Neurology	25	10	15
Orthopedics	55	25	30
Surgery	45	15	30
Psychology	15	15	.....
Roentgenology	5	5	.....
Therapeutic exercise	115	40	75
Total hours	1,100	345	755

* The course will last for twenty-five weeks, forty-four hours per week, making a total of one thousand, one hundred hours. Student technicians who complete this course will be required to obtain six months of additional practical training before final certification.

On completion of this six month emergency course, it has been arranged with the War Department and with the United States Civil Service Commission to have these students serve their additional six months' practical training in Army hospitals, as apprentice physical therapy aids. In an announcement issued on Sept. 1, 1942, the United States Civil Service Commission stated that applicants for positions as apprentice physical therapy aids "will be assigned to duty as apprentice aids in an Army hospital for a six months' period of training." Furthermore, it is stated that applications will be accepted from women only and that on successful completion of the period of apprentice training, such apprentice aids will be appointed to positions as regular physical therapy aids. Finally, those women appointed "will be expected to remain with the service for not less than one year and in any location required by the army."

Those accepted as apprentice aids must have been enrolled in or have successfully completed "a full, special, condensed course leading to graduation from a school of physiotherapy meeting the standards established for the duration of the emergency by the American Medical Association." According to this plan, which has now been under successful operation for

more than a year, the largest possible number of technical aids are supplied to the Army hospitals in the shortest possible time. This plan has contributed materially to the training program, and various civilian medical centers have already sent large numbers of trained personnel to the military services. Some idea of this contribution can be gained from our own experience in the section on physical therapy at the Mayo Clinic (fig. 2). Already, as shown in figure 2, our department has sent eighty-eight persons into governmental institutions, and before this is published a total of more than one hundred and fifty trained physical therapy physicians and technicians will have been prepared for active service.

Comment

Not only is it essential in the teaching effort during the war to train physicians and technical aids actually to conduct military departments of physical therapy, but it is essential that we should provide as much information as possible concerning physical therapy and occupational therapy for all medical officers in military service. To this end the Subcommittee on Physical Therapy of the National Research Council has prepared, in conjunction with the Council on Physical Therapy of the American Medical Association and with the Committee on Information of the Division of Medical Sciences of the National Research Council, a manual of physical therapy.[8] This manual was published in War Medicine in March, 1942, and is now available in reprint form for free distribution to all Army and Navy medical officers on active duty. It can be obtained by writing to the Secretary of the Council on Physical Therapy of the American Medical Association, Mr. H. A. Carter, at 535 North Dearborn Street, Chicago.

In addition, the Subcommittee on Physical Therapy and the Council on Physical Therapy now are reviewing an excellent small "Manual of Occupational Therapy," which it is hoped will be ready for publication in the near future. These two manuals should help a great deal to teach the rank and file of military physicians concerning the rudiments of physical and occupational therapy as applied to war medicine. They should enable these physicians more intelligently to discuss with the trained medical officers who are in direct charge of physical therapy departments the physical treatment of persons disabled in war.

Because of the limited number of persons who are trained in physical medicine, it is to be hoped that both physical therapy physicians and physical therapy technicians will be properly assigned in Army and Navy hospitals. It must be stressed that the personnel divisions of the Surgeon General's office of the Army and of the Bureau of Medicine and Surgery of the Navy have been prompt in seeing that proper assignments are made. It is, of course, natural to expect that during the present enormous expansion of personnel, some persons will be improperly assigned at first. But our opinion is that these personnel divisions are doing a remarkably capable job and are promptly correcting any misplacements of personnel whenever such a plan is feasible. They are "fitting the square pegs into square holes and the round pegs into round holes" with the utmost expedition.

One of the great problems confronting those persons interested in the teaching of physical medicine during this war has to do with the filling of the technical schools. Coulter and Carter have pointed out that two methods are now being employed to overcome the immediate shortage of physical therapy technicians.

First, the United States Office of Civilian Defense in its bulletin "Volunteers in Health, Medical Care and Nursing" is providing for the training of volunteer physi-

cal therapy assistants. These assistants are to aid trained technicians but are not to assume any independent responsibilities for therapeutic procedures.

It is hoped that some trained physical therapy technicians who are assistants in large physical therapy departments of civilian hospitals will be relieved for services elsewhere by the use of these volunteer physical therapy assistants.

Coulter and Carter mentioned that a second method of overcoming the shortage is

> . . . to increase the number of students in approved physical therapy courses by an educational campaign in colleges. The National Society for Crippled Children, Inc., is aiding this campaign by distributing to every college in the country a poster "The Nation Needs Physical Therapeutists."

This campaign to increase the number of students in approved courses must be pushed to the very limit. Only about the first of October the subcommittee on Physical Therapy of the National Research Council sent letters to all of the schools for physical education for women, urging that all grad-

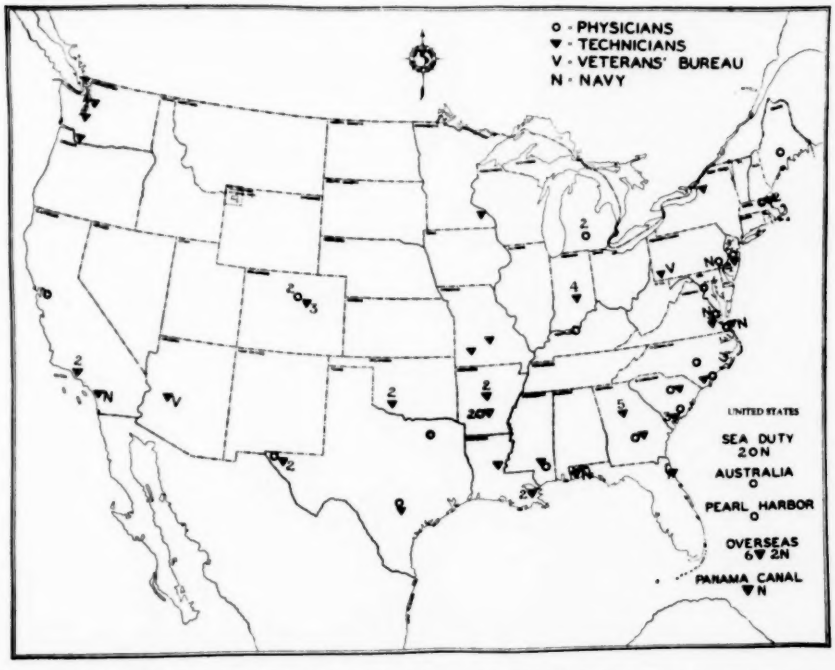

Fig. 2. — The distribution of physical therapy physicians and technicians from one physical therapy center (Mayo Clinic). Unless otherwise specified, the persons listed are serving in the Army. The letter N appears beside those who are serving in the Navy, and the letter V appears beside those serving in a Veterans' Bureau. It will be noted that this one center has provided eighty-eight persons for active duty in physical therapy, twenty-nine medical officers and fifty-nine technicians.

uates in physical education consider the possibility of entering one of the approved schools for physical therapy technicians. Vigorous campaigning must be done to fill these schools.* It must be reiterated that the facilities for training physical therapy technical aids are apparently adequate. More schools are not needed, rather more students to fill the existing schools.

Another fundamental point which must be emphasized is the necessity for direct medical supervision of all technical aids, no matter how well

* Since the presentation of this paper this campaign has been continued with considerable success. By November 20 more than two thousand, five hundred applications had been received from persons who signified their desire to obtain training for service as physical therapy technicians (aids) in military hospitals. We now believe that there is a reasonable certainty that the schools for physical therapy technicians will be filled with well prepared students.

they may have been trained. Physical therapy technical aids in a military hospital should always be required to work under the direct medical supervision of a trained physical therapy physician who is in constant supervision of the physical therapy department.

It is pleasing to note that the logical improvement of the status of physical therapy in military hospitals is already beginning. For example, we have learned recently that at one of the large Army hospitals (the Fitzsimons General Hospital, in Denver) physical therapy has been established as a separate subdivision under the division of surgery. This is certainly a step in the right direction. Because of the importance of modern physical therapy, it is to be hoped that all Army and Navy hospitals will consider a similar step. The extensive employment of physical therapy in the modern military hospital warrants the establishment of a separate subdivision of physical therapy.

Finally, in discussion, it is important to stress the fact that modern physical therapy is entirely different from the physical therapy that was practiced during the last war. Its departments must be properly supervised, properly staffed and properly equipped. The modern military physical therapy department is of such great importance and handles such a high percentage of patients that it should never be left in the hands of technical aids. Nominal supervision by a physician who devotes his time to some other specialty is not satisfactory in meeting present day demands.

Because of the remarkable development of physical therapy during the first World War its growth was greatly increased during the ensuing years of peace. World War I gave the first great impetus to the advancement of physical therapy. If the teaching of physical therapy is properly organized during this war, there is an opportunity to give still another tremendous lift to this important phase of medical practice. This opportunity must not be neglected.

102 Second Avenue, Southwest.

References

1. Krusen, F. H.: (*a*) Rehabilitation of the Chronically Disabled with Special Reference to the use of Physical Measures, Mil. Surgeon **84**:339 (April) 1939; (*b*) Physical Measures for Treatment of the Disabled, ibid. **86**:391 (April) 1940; (*c*) The Need for Trained Personnel in Army Departments of Physical Therapy, editorial, Surg. Gynec. & Obst. **74**:1160 (June) 1942; (*d*) The Place of Physical Medicine in the Defense Program, Arch. Phys. Therapy **23**:453 (Aug.) 1942.

2. Coulter, J. S., and Carter, H. A.: Need for Physical Therapy Technicians, War Med. **2**:824 (Sept.) 1942.

3. McCormick, D. W.: Physical Reconstruction and Vocational Education in the World War of 1914 to 1918, Arch. Phys. Therapy **23**:348 (June) 1942.

4. Coulter, J. S.: Physical Therapy in the Military Service, J. A. M. A. **115**:864 (Sept. 7) 1940.

5. Perrott, G. St. J., and Dorn, H. F.: Imminent Needs for Hospital Personnel, Hospitals **16**:46 (March) 1942.

6. Schools for Physical Therapy Technicians, report of the Council on Medical Education and Hospitals, J. A. M. A. **118**:1136 (March 28) 1942.

7. Essentials of an Acceptable School for Physical Therapy Technicians, report of the Council on Medical Education and Hospitals, J. A. M. A. **112**:926 (March 11) 1939.

8. Physical Therapy: A Manual Prepared by the Council on Physical Therapy of the American Medical Association, and the Subcommittee on Physical Therapy and the Committee on Information of the Division of Medical Sciences of the National Research Council, War Med. **2**:295 (March) 1942.

ARTIFICIAL FEVER THERAPY IN BRUCELLOSIS *

GENEVIEVE L. JOY, M.D.

and

FRED B. MOOR, M.D.

LOS ANGELES, CALIFORNIA

The widespread distribution of brucellosis, the diagnostic difficulties in chronic cases, and the high percentage of therapeutic failures have made this disease a major health problem. It is becoming more and more apparent that in many instances, especially as regards chronic ambulatory patients, the diagnosis is not made and the treatment is inadequate. The multiplicity of symptoms and the lack of objective findings often result in a diagnosis of neurasthenia, which, as far as the patient is concerned, merely adds insult to injury.

The treatment of brucellosis is in an unsatisfactory state. The acute cases present less difficulty than the chronic ones. Among the successful methods of treatment so far reported, we find the intravenous injection of Metaphen, acriflavine hydrochloride, and mercurochrome. The sulphonamide drugs are effective, but recurrences are common after their use. S. Miller[1] (1933), P. Manson-Bahr[2] (1933), G. E. Beaumont and A. P. M. Page[3] (1935), and C. E. Ervin, H. F. Hunt and J. S. Niles[4] (1936) have each reported on from one to ten patients cured by the intravenous injection of typhoid-paratyphoid vaccine. F. E. Angle[5] (1933) used a specific vaccine prepared from a mixture of equal parts of porcine and bovine organisms in 100 cases. Over 85 per cent of his patients were reported as cured, but he did not specify how many were acute and how many were chronic cases. In several of the methods mentioned above, the production of fever was undoubtedly an important factor in the favorable outcome.

In 1936 L. E. Prickman and W. C. Popp[6] announced cures in three cases of brucellosis after treatment by three sessions per case of artificial fever in the Kettering Hypertherm. C. M. Carpenter and R. A. Boak[7] in the same year reported three patients cured with single doses of fever in the Warren radiant heat cabinet. In 1938 L. E. Prickman, R. L. Bennett and F. H. Krusen[8] reported on eighteen patients, nine of whom were treated at the Mayo Clinic and nine by other investigators according to Krusen's technic. Clinical remissions were obtained in 77.8 per cent of those treated at the Clinic and in 88.9 per cent of those treated by others. In 1939 E. C. Elkins and F. H. Krusen[9] presented an additional report of fifteen patients treated at the Mayo Clinic with apparent cure in 80 per cent. The average duration of the disease in their series was 3.5 months with a variation of ten days to one year. The average number of treatments was 4.4 and the average number of hours of fever at 105 F. was 14.4. W. M. Simpson[10] reported that a patient had been successfully treated in the Kettering Hypertherm with ten hours of fever at 105 F. W. J. Zeiter[11] also obtained favorable results in one case with three doses of fever produced by electromagnetic induction.

Presentation of Cases

Our first experience with artificial fever in the treatment of brucellosis was in the summer of 1937. The case was an acute one, and a clinical

* Reprinted with permission, Brit. J. Phys. Med. 6:34 (March-April) 1943.

CASE TABLE.

No.	Name	Sex	Age	Duration Symptoms	Agglut.	Skin Test	TREATMENT No.	Freq.	Temp.	Total Hours	Result	Follow-Up
						Acute						
1	F. P.	F.	25	1 mo.	1–320	—	2	2xwk.	103–4	7	Recovery	62 mo.
2	N. B.	M.	43	1 mo.	1–320	—	6	2xwk.	105	28	Remission	30 mo.
3	K. N.	M.	22	1 mo.	1–640	—	7	2xwk.	104–5	23	Remission	26 mo.
4	C. W.	M.	25	2 mo.	1–320	—	7	2xwk.	104–5	34	Remission	18 mo.
5	W. T.	M.	30	1 mo.	1–1280	—	5	2xwk.	105	25	Temp. imp.	12 mo.
6	C. G.	M.	50	1 mo.	1–80	—	6	2xwk.	105–6	27	Remission	10 mo.
						Chronic						
7	J. L.	F.	47	24 mo.	1–80	—	10	2xwk.	104–5	40	Temp. imp.	54 mo.
8	E. H.	M.	31	42 mo.	neg.	neg.	10	2xwk.	104–5	40	Recovery	52 mo.
9	D. C.	M.	26	15 mo.	1–160	—	5	2xwk.	104–5	22	Remission	38 mo.
10	E. K.	F.	23	24 mo.	1–160	—	9	2xwk.	104–5	29	Remission	36 mo.
11	M. C.	F.	11	48 mo.	neg.		6	2xwk.	103–4	22	Remission	36 mo.
12	L. S.	F.	24	5 mo.	1–160	—	6	2xwk.	105	30	Temp. imp.	36 mo.
13	S. P.	M.	64	5 mo.	1–500	—	2	1xwk.	104–5	7	Remission	14 mo.
14	A. B.	M.	27	84 mo.	neg.		8	2xwk.	104–5	40	No imp.	24 mo.
15	D. R.	M.	39	18 mo.	1–320	—	13	2xwk.	104–6	52	Temp. imp.	30 mo.
16	I. S.	F.	26	12 mo.	1–320		7	2xwk.	104–5	28	Remission	18 mo.
17	E. K.	F.	32	3 mo.	1–40		5	2xwk.	104–5	20	Remission	36 mo.
18	H. L.	M.	45	42 mo.	1–160	—	8	2xwk.	102–4	23	Remission	8 mo.

remission was obtained. Since then equally good results have been obtained by us in four other acute cases. Another patient with acute brucellosis had a partial relapse. The average duration of the disease in the patients before they came for treatment was one month. In addition to these six acute cases, artificial fever has been employed for twelve patients with the chronic form of the disease, the average duration of which had been 26.8 months. These eighteen acute and chronic cases are summarized below.

Several of the cases summarized in the table opposite merit special mention.

CASE 2. — N. B. had a severe acute infection which, as indicated by the history, probably came from swine. The patient showed only moderate clinical improvement after three sessions of artificial fever. Therefore, he was given, during the last half of his treatment period, 1 gramme (15 grains) of sulphanilamide every four hours in addition to the fever. He was well after a series of six treatments and has remained so during a subsequent period of two and a half years.

CASE 5. — W. T. was a negro who, before fever therapy, on September 10, 1941, showed an agglutination titre of 1 in 1280. A month after completing his treatment his agglutination reaction was negative, he felt well and had gained eleven pounds in weight. On December 14, 1941, he appeared at the out-patient clinic complaining of headache and fatigue. He was found to have an agglutination titre of 1 in 1600 and a temperature of 99 F. A month later he had no fever and felt better, but his agglutination titre was still 1 in 800. During the next three months, the titre gradually came down to 1 in 320 and the patient showed signs of nervousness and fatigue but not of fever. Although artificial fever produced a complete clinical remission lasting two or three months in this case and permanently relieved the clinical fever, there was, nevertheless, a relapse as indicated by the recurring symptoms and the agglutination tests. The patient is still under observation, but the fever therapy has not been repeated.

CASE 7. — J. L. had had a variety of treatment including sulphanilamide, typhoid-paratyphoid vaccine, specific vaccine, specific serum, and hot tub baths, all to no avail. She was given four sessions of artificial fever in January, 1938, three in June, 1938, in combination with sulphanilamide, and five in June, 1941. Each series was followed by a remission lasting about one month. Of all the treatments which she received artificial fever produced the most satisfactory clinical results, according both to the patient and to her physician.

CASE 8. — E. H. was studied with great care and although all laboratory tests were negative, his attending physician, on the basis of his history and examination, was certain of the diagnosis of brucellosis. He was relieved of his symptoms by fever therapy and was able to return to work after several months of illness.

Case 9. — D. C., a medical student, had a spondylitis of twelve months' duration. An orthopaedic consultant had suggested spinal fusion. Five sessions of artificial fever cleared up his condition completely. He has remained well during a subsequent period of observation of three years.

Case 11. — M. C., a little girl of eleven, the daughter of a pathologist, had been ill with recurring bouts of fever for a period of four years. She had had seven courses of sulphanilamide and two courses of vaccine therapy with only temporary remissions. Her agglutination test was negative, but her skin test was strongly positive. The opsono-phagocytic index showed marked phagocytosis in 62 per cent of the cells; after three sessions of artificial fever, this figure had risen to 75 per cent. After six treatments she was well and has remained in remission during an observation period of three years.

Case 13. — S. P., a 64-year-old Hindu male, the oldest patient in the series, took fever therapy well and had no clinical fever after his first session in the fever cabinet. He was given, however, a second treatment and remained well until his final illness and death fourteen months later from intestinal obstruction.

Case 14. — A. B. gave the longest history of the disease in the series. His clinical history was typical, the skin test was negative. He was given full doses of sulphanilamide together with eight sessions of fever therapy but there was not any response to treatment except a toxic reaction to the drug.

Case 15. — D. R., a physician, had received both sulphanilamide and specific vaccine without benefit before he sought treatment by artificial fever. His first course of six treatments resulted in a remission of ten months' duration. A second series of seven treatments produced a remission of only one month. During a subsequent observation period of a year and a half, further vaccine therapy has not been of any benefit.

Fig. 1. — Arrangement of the fever equipment.

Apparatus

All of the patients in the series, except the first one, have been treated in a specially designed cabinet heated and humidified by hot water vapor. This vapor is produced by passing steam through a jet, thus lowering its temperature to a point at which it will not burn the skin. The hot vapor furnishes adequate heat and complete saturation, both of which are desirable for efficient fever production. The patient's rectal temperature is registered and recorded by a Leeds Northrup Micromax Recorder. Figure 1 shows the arrangement of the fever equipment, and figure 2 is a cross-section diagram of the high humidity cabinet used in the treatment of the patients reported on in this series.

Discussion

From our experience with the use of artificially induced fever, we feel that it is of definite value in the treatment of brucellosis. We recognize the fact, however, that our series of cases is too small to evaluate properly the place which fever therapy will occupy eventually in the treatment of this disease.

The use of the word, cure, in connection with the treatment of brucellosis is unsafe. The tendency to relapse is common and according to H. J. Harris[12] (1940) relapses may occur spontaneously as late as six years after apparent recovery. Harris advocated a "follow-up" period of four years before drawing definite conclusions as to therapeutic results. He considers

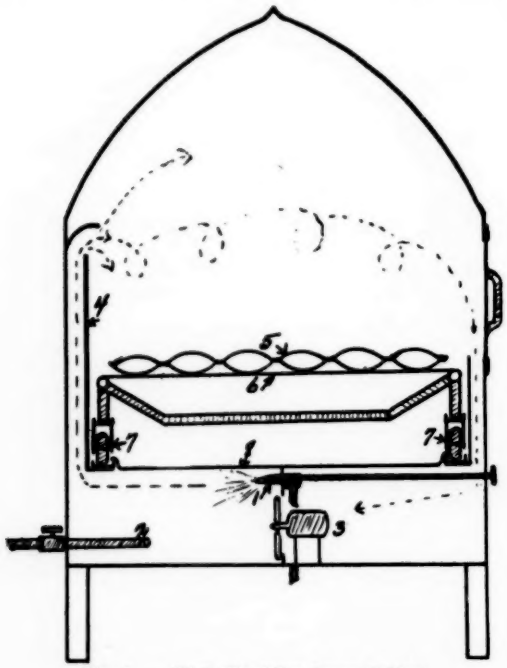

Fig. 2. — High Humidity Fever Cabinet.

1. Steam jet.
2. Auxiliary steam inlet.
3. Fan.
4. Baffle.
5. Air mattress.
6. Rubber hammock.
7. Carriage.
8. Drainage.

the term, clinical remission, a safer one than cure, in brucellosis. Our patients have been under observation after treatment for periods of from eight months to five years. For patients remaining well after four years, we have used the term, recovery, and for those observed for less than four years the term, clinical remission. In our series of eighteen cases, thirteen, or 72.2 per cent, have shown clinical remissions. The percentage of remissions in the acute cases was 83, and in the chronic cases 66. In seven of the cases in the series sulphonamides had been used without benefit before the patients came for fever therapy. In only one of the four cases in which sulphanilamide was used in combination with fever was it of any apparent value. Even in this one instance its effect was open to question.

Summary

(1) Of the various methods reported for the treatment of acute and chronic brucellosis, fever therapy, whether produced by physical means or by the injection of foreign protein, appears to rank among the best.

(2) Eighteen patients with acute and chronic brucellosis were treated with artificial fever. In thirteen of the eighteen cases, or 72.2 per cent, there were clinical remissions. In five, or 83 per cent, of six acute cases and in eight, or 66 per cent, of twelve chronic cases there were favorable responses.

(3) Sulphanilamide appeared to be of value in only one of four cases in which it was combined with artificial fever in the above series.

References

1. Miller, Sinclair: Protein Shock Therapy in Undulant Fever, Lancet **7**:1177 (June 3) 1933.

2. Manson-Bahr, P.: Undulant Fever of Abortus Type Treated by Protein Shock, Lancet **1**:1178 (June 3) 1933.

3. Beaumont, G. E., and Page, A. P. M.: Undulant Fever Treated by Protein Shock, Lancet **2**:940 (Oct. 26) 1935.

4. Ervin, C. E.; Hunt, H. F., and Niles, J. S., Jr.: Foreign Protein Therapy; Treatment of Undulant Fever by Intravenous Injection of Killed Typhoid-Paratyphoid "A" and Paratyphoid "B" Bacilli, Am. J. M. Sc. **192**:234 (Aug.) 1936.

5. Angle, F. E.: Treatment of Acute and Chronic Brucellosis (Undulant Fever). Personal Observations of One Hundred Cases Over a Period of Seven Years, J. A. M. A. **105**:939 (Sept. 21) 1933.

6. Prickman, L. E., and Popp, W. C.: Treatment of Brucellosis by Hyperpyrexia Induced by the Simpson-Kettering Hypertherm, Proc. Staff Meet., Mayo Clin. **11**:506 (Aug. 5) 1936.

7. Carpenter, C. M., and Boak, R. A.: Treatment of Human Brucellosis; Review of Current Therapeutic Methods, Medicine **15**:103 (Feb.) 1936.

8. Prickman, L. E.; Bennett, R. L., and Krusen, F. H.: Treatment of Brucellosis by Physically Induced Hyperpyrexia, Proc. Staff Meet., Mayo Clin. **13**:321 (May 25) 1938.

9. Elkins, Earl C., and Krusen, Frank H.: Clinical Results of Fever Therapy, Arch. Phys. Therapy **20**:346 (June) 1939.

10. Simpson, W. M.: Discussion in Edvin, C. E., and Hunt, H. F., "Undulant Fever," J. A. M. A. **109**:1966 (Dec. 11) 1937.

11. Zeiter, W. J.: Treatment of Undulant Fever by Artificial Fever Therapy. Report of Case, Cleveland Clin. Quart. **4**:309 (Oct.) 1937.

12. Harris, H. J.: Physical Therapy of Various Manifestations of Brucellosis (Undulant Fever). Arch. Phys. Therapy **21**:605 (Oct.) 1940.

Preliminary Report of Results Observed in Eighty Cases of Intractable Bronchial Asthma — Miley, *et al.*

(*Continued from page 542*)

Discussion

Dr. G. J. P. Barger (Washington, D.C.): The good results in intrinsic bronchial asthma in cases which had resisted all other known forms of treatment, as reported by Dr. Miley and associates, as a result of ultraviolet blood irradiation therapy, using the Knott technic, must stir a bit of new hope in the minds of physicians who have been baffled by their inability to help many such sufferers.

I myself have given 42 treatments by blood irradiation to 12 patients in recent months and have felt the gratitude of these patients at the relief afforded and have seen duplicated some of the results reported.

The chief of the allergy clinic in the hospital where I work, who has been referring patients with asthma for blood irradiation, has also spoken most cordially of the results he has observed.

A few theoretic considerations are in order.

Pottenger, in his article on vegetative imbalance in disease in the Cyclopedia of Medicine, says: "Allergic reaction is characterized by widespread stimulation of the parasympathetics together with a tendency to more marked local expression in certain structures. Vasodilatation marks allergy, whether local or widely distributed. Allergy may show itself in various tissues, but the bronchial musculature, the nasopharyngeal structures, the intestinal tract, and the dermal tissues are most commonly affected. Asthma has several aspects, i. e., muscular, glandular, and vascular. The bronchial muscles in asthma are contracted, lessening the bronchial lumen. The glandular apparatus is stimulated to an increased secretory activity. On account of the reduced size of the lumen, it is difficult to force either air or secretion through. The vascular element consists of an increased permeability of the vessel walls, which permits of exudation into the tissues, and which acts with the constricted bronchi as a deterrent to the ready passage of air and secretion."

Doctors Miley and Rebbeck, in their paper published in the January-February, 1943, issue of *The Review of Gastroenterology*, call attention to the "dramatic abolition of paralytic or adynamic ileus as one of the chief clinical observations made during the course of our work with blood irradiation in peritonitis."

In Dr. Miley's paper in the *American Journal of Surgery*, June, 1943, on ultraviolet blood irradiation therapy in the control of acute thrombophlebitis, he discusses more fully the physiologic considerations involved in the favorable effects of ultraviolet blood irradiation seen on both smooth muscle of the intestines, and on the vascular tissues, summarizing his conclusions as follows:

"In any event, there exists a close relation between ultraviolet blood irradiation therapy, on the one hand and restoration to normal of an autonomic regulatory mechanism hopelessly out of balance, due to such pathologic processes as found in paralytic ileus and acute thrombophlebitis."

With the presentation of Dr. Miley's experience with bronchial asthma, another predominantly autonomic nerve system imbalance, it appears evident that this favorable action of blood irradiation on the autonomic nerve regulatory mechanism out of balance, extends also to the parasympathetic syndrome of asthma and partly explains the good results attained.

Experience has already shown that some other types of allergy are also favorably influenced by ultraviolet blood irradiation, including the exudative symptoms of chronic sinusitis and hay fever.

This paper, together with others previously published in various journals, shows that we have in ultraviolet blood irradiation therapy, as developed by Knott, a therapy of superior value, not only in acute bacterial or virus invasion with toxemia from focal or blood stream infections, but also it is a measure of considerable value in a number of chronic conditions which have been difficult therapeutic problems.

The chemical and biologic effects of ultraviolet light thus carried to all the tissues of the body in the blood stream, in an unusual degree mobilizes the biologic forces of the body concerned with restoring its functions to normal. We have no other physical therapeutic agent of such wide, rapid and favorable effects, with no untoward side effects or late effects.

Dr. Walter F. Simmonds (Oak Park, Ill.): I would like to know if either of the gentlemen have made any study of the eosinophils?

Dr. George Miley (closing): We originally made eosinophil counts of many of our asthmatic patients and we saw that some of them did not have high eosinophil counts and that in some of our patients who had recovered from their severe asthmatic symptoms there still remained a high eosinophil count although their clinical symptoms had disappeared. We saw just the opposite occur when the eosinophil count was not prominent at any time and at no time was it very high. We saw several patients with and without eosinophilia who received no response to our therapy nor to that of other forms of therapy so that we finally discontinued using the eosinophil count as an index of asthmatic recovery or even of diagnosis. I wish to thank Dr. Barger for his discussion.

ARCHIVES of PHYSICAL THERAPY
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL THERAPY

.·. EDITORIALS .·.

A MASTER'S DEGREE IN PHYSICAL MEDICINE NOW AVAILABLE

Your editor was informed recently that most of the members of the Congress of Physical Therapy probably did not realize that it is possible to obtain a master's degree in physical medicine.

Dr. Stafford L. Osborne of Northwestern University Medical School informs us that that university now offers a master of science degree in physical medicine which can be awarded after a suitable period of graduate training and that training in this field is open only to doctors of medicine. In a similar manner, the Mayo Foundation of the University of Minnesota has been offering three-year fellowships in physical medicine since 1936. On successful completion of one of these fellowships, the degree of master of science in physical medicine is awarded. These fellowships are open only to doctors of medicine who have completed a suitable internship.

It is to be hoped that other universities will also offer such extensive graduate training in physical medicine. It is our belief that a graduate course to prepare a physician to specialize in physical medicine should include the following:

I. *Training in certain fundamental subjects*:

A. Physics of light, heat electricity and mechanics, as applicable to physical therapy.

B. Anatomy: Special study of the anatomy of the peripheral nervous system, the muscles, blood vessels, bones and joints, special attention being paid to kinesiology and topographic anatomy; also a study of pathologic anatomy, with particular reference to trauma.

C. Physical chemistry, with special reference to its relation to physical therapy.

D. Physiology of muscle, nerve, blood, circulation and digestion, with particular reference to the application of physical agents for the correction of abnormal physiologic processes and electrophysiology (the physiologic basis of physical therapy).

II. *Training in research*:

A. At least one assigned or selected problem in laboratory research on some subject related to physical therapy. Special research in some such subject as: (1) biophysics in relation to physical therapy, (2) the effects of high-frequency currents on local physiologic processes, (3) the use of interrupted and waved galvanic currents in the production of muscular contractions, (4) problems in the physiologic effects of local or general applications of heat, and (5) studies in body mechanics, and so forth.

B. At least one assigned or selected problem in clinical research on some phase of the clinical application of physical agents. Special clinical research in some problem as: (1) a comparative study of the surface temperatures produced by the application of various physical heating agents, (2) a controlled clinical study of the effects of local heat in chronic or acute

inflammatory processes, (3) a study on the effect of corrective exercises in the treatment of scoliosis, (4) a controlled clinical study of the most effective physical measures to be used in the correction of contractures, and (5) a study on the use of hydrogymnastics in the treatment of flaccid paralysis, and so forth.

III. *Actual clinical and hospital training in the study and treatment of patients by various physical agents in the physical therapy department of a teaching hospital together with other special training*:

A. Work in light therapy, thermotherapy, fever therapy, hydrotherapy, electrotherapy and mechanotherapy in hospital physical therapy department.

B. In addition to this work in the hospital therapy department, assignments or electives in subjects allied to physical therapy, according to the individual wishes of the student when possible, that is, orthopedics, neurology, dermatology, roentgenology, pediatrics, general medicine or surgery, and so forth.

C. During this phase of clinical study, preparation or collaboration in preparing, at least one scientific paper on some subject related to physical therapy in such a manner that no doubt will be left as to student's familiarity with his subject or with its presentation in proper literary style.

D. Training in the art of medical writing, cultural studies in history, foreign languages, literary style, speaking before groups, and so forth.

E. Participation in seminars in physical therapy, journal clubs, abstract clubs, and training in administration, record keeping, handling of personnel, medical contacts, in the development of new types of physical devices for the treatment of disease and so forth.

Members of the Congress of Physical Therapy should urge young physicians to consider such fellowships in order to advance the fundamental knowledge of physical medicine.

THE CONGRESS AND MILITARY PHYSICIANS

It is extremely gratifying to find that a large number of physicians of the army, navy and Veterans Administration, who are now conducting departments of physical therapy in our governmental hospitals, have applied for membership in the American Congress of Physical Therapy.

These governmental physicians will have the opportunity in their extensive departments to carry physical therapy to new heights. We believe that their addition to the membership of the Congress will be of great benefit, both to the congress and to them. In years to come these brilliant young physicians should become the backbone of our membership. Meetings of the congress from year to year will be the occasion for reunion with old friends of the military services and for review of experiences in the great war.

We extend a cordial invitation to them to participate freely and wholeheartedly now in all the activities of the congress.

MEDICAL NEWS

Limitations Order on Physical Therapy Equipment Up for Reconsideration

The Congress on Physical Therapy has been working strenuously to obtain some liberalization of the War Production Board's ruling limiting the sale of physical therapy equipment. While every physician connected with the Congress is desirous of seeing that essential materials go first to meet the needs of the war effort nevertheless we believe that physicians should have first consideration when it comes to the alloting of materials not essential to the war effort.

Just as a mechanic must have the tools of his trade so must the physician have the instruments of his profession. Physical Therapy limitation's order L-259 has now been in effect for six months and it has been announced by the War Production Board that it is the opinion of the division of safety and technical equipment of the War Production Board that sufficient time has now elapsed to bring to light any changes which should be made in the order. Order L-259 limits very drastically the sale of physical therapy equipment and the Congress of Physical Therapy will make every effort to see that the changes are made which will liberalize the order without damaging the war effort. It is to be hoped that the representatives of the War Production Board will see the logic of providing physicians with the devices of their profession. These are essential in accomplishing the important steps in rehabilitation which must now be taken. We cannot hope to provide adequate rehabilitation of soldiers, sailors and industrial workers who have been maimed in the war effort unless we have sufficient equipment to do the job.

Colonel Hume Appointed Health Officer of Occupied Sicily

In an Associated Press dispatch from the allied headquarters in North Africa on July 18 concerning Gen. Harold Alexander's proclamation to the people of Sicily as military governor for the Allies of that island, it was pointed out that several AMGOT (Allied Military Government of Occupied Territory) leaders were already in Sicily or preparing to go soon in connection with the establishment of military government on that island; among those named in this category was Col. Edgar E. Hume of the Army Medical Corps, who was listed to be chief American health officer. Colonel Hume graduated from Johns Hopkins University School of Medicine in 1913 and entered the Medical Reserve Corps as a first lieutenant on Sept. 16, 1916. He had been director of administration at the Medical Field Service School, Carlisle Barracks, Pa., since 1937.

Polio Epidemics: Summer 1943

Polio, after first involving southern California, continues an accelerated march across America. It has swung northward from Texas to Oklahoma and Kansas, struck from Kansas into Illinois, jumped to Connecticut and at the same time made further inroads in the states of Washington and Oregon.

According to official figures as of July 31 there were 2,317 new cases of poliomyelitis reported in the United States this year as against a total of 1,020 cases reported up through the week ended August 1, last year. Unofficial figures for this year as of the first week of August reveal more than 2,700 cases and the total is constantly growing.

A study of the records for the past three years shows that in 1940 the peak of the epidemic was reached September 14; in 1941 the last week of August marked the high spot for new cases reported, and last year the peak occurred the second week of September. Now, the crucial weeks of the 1943 epidemic peak season are at hand.

Foundation in Action

On July 30, Mr. O'Connor, reporting the results of the 1943 Appeal over a coast-to-coast NBC hookup, devoted a large part of his radio address to the present epidemic and how the Foundation is coping with the outbreaks.

"When these outbreaks occur there are certain definite aids that are needed," Mr. O'Connor said. "More skilled hands are called for to help heal and mend the stricken bodies. Far in excess of normal needs, hospital services, ambulances, wool, machines, apparatus of all kinds must be secured. Doctors, nurses, physical therapy technicians are required. Laboratory services must be increased. This is the job to be done and we are doing it.

"The National Foundation has told its Chapters that if they exhaust their funds in providing the many services which they are called upon to give and which only they can give, then the National Foundation will advance to them additional money to meet the situation fully and adequately. No patient must be allowed to go without the proper hospital, medical or nursing care — *for any reason!*"

Mr. O'Connor told of how the Foundation springs into action at the threat of epidemics; how Dr. John L. Lavan, Director of Research, was sent to California where he con-

ferred with health officers, hospital officials and Chapter Officers in the stricken area.

Mr. O'Connor pointed out that he had sent Dr. Robert L. Bennett, Director of Physical Therapy at the Georgia Warm Springs Foundation, to northern Texas and Oklahoma to meet with local health and medical authorities and to advise Foundation Chapters how they might best serve. Also, he told his radio audience of the work being done by Foundation grantees in the affected areas.

Polio Fighters

"It is during an epidemic," Mr. O'Connor stated, "that opportunities are given for the study of all phases of this disease." Among grantees conducting epidemiological studies in the stricken sectors are Drs. Karl Meyer, Wm. McD. Hammon and associates of the University of California, John Kessel and co-workers of the University of Southern California, Thomas Francis, Jr., and H. E. Pearson of the University of Michigan and David Bodian of the Johns Hopkins University School of Hygiene and Public Health.

Physical Therapy Technicians Urgently Needed!

Wartime demands have made drastic inroads into our country's medical complement. Many communities untouched by infantile paralysis outbreaks are faced with a genuine shortage of doctors, nurses and physical therapy technicians.

With over 2,700 cases reported as of the first week of August, areas with even minor epidemics are desperately in need of those services which only the physical therapy technician can administer. One of our opportunities for service is to supply these workers to hospitals, clinics and health departments when they are needed to provide adequate treatment.

The National Foundation appeals to its Chapters to ascertain promptly the availability of such trained technicians in their communities. This will serve a two-fold purpose. First—you will know how well prepared you are to meet the needs occasioned by a local outbreak. Second—if your area does have such workers trained in the newer methods of treating polio and if there are no cases to be cared for we should like to "borrow" these skilled workers and send them into an epidemic area.

These technicians would, of course, be subject to recall by their home community in the event an outbreak should demand their aid.

Expenses Furnished

The National Foundation will see to it that the salaries of such emergency workers shall continue, that their travel expenses are furnished and that part, or all, of their living expenses are met while they are in the field.

If they are familiar with the basic principles of early physical therapy, these physical therapy technicians need not have had intensive training in the Kenny method. There are many vital after-care duties which they can perform ably for polio patients with even a minimum of training.

All Benefit

Not only will those areas to which these "borrowed" workers are allocated benefit from their skills but those skills themselves will be increased, for it is in time of epidemics that progress is accelerated in the treatment of the disease. Thus their home communities will derive genuine benefit also through the knowledge these workers will have gained while employed in the epidemic areas. If indicated, they will be assigned to work under skilled supervision.

We cannot voice too strongly the imperative need for these technicians NOW. Here at the National Foundation requests for technicians are pouring in from the affected areas, requests in far greater number than we can possibly meet without *your* aid. We have done much in securing trained workers and seeing to it that their talents are being used to the fullest in those sectors to which they have been assigned to "combat" duty. But the epidemic period has just started. The need will be greater.

As in war, reinforcements are needed continually, and these physical therapy technicians form an essential corps of our home-front army. Therefore, we repeat that if our Chapters know of physical therapy technicians whom we can "borrow" in this real emergency, please telephone or wire us, collect, immediately. The telephone number is BEekman 3-0500.

New Industrial Hygiene Officers

The National Conference of Governmental Industrial Hygienists at its meeting in Rochester, N. Y., elected Dr. Paul A. Brehm, Madison, Wis., chairman; Manfred Bowditch, Boston, vice-chairman, and J. J. Bloomfield, Washington, D. C., secretary-treasurer. Officers of the American Industrial Hygiene Association chosen for the coming year include Helmuth H. Schrenk, Ph.D., Pittsburgh, president; Mr. Bloomfield, president-elect; Edgar C. Barnes, Pittsburgh, secretary, and John B. Littlefield, Pittsburgh, treasurer. The American Association of Industrial Physicians and Surgeons chose the following officers: Drs. Harvey Bartle, Philadelphia, president; Frederick W. Slobe, Chicago, president-elect; Melvin N. Newquist, New York, and Loyal A. Shoudy, Bethlehem, Pa., vice-presidents, and Edward C. Holmblad, Chicago, treasurer and managing director.

Association of Military Surgeons of the United States

The most important medical meeting ever held in this nation in time of war will convene in Philadelphia October 21, when the Association of Military Surgeons of the United States begins its three-day sessions in the Bellevue-Stratford Hotel to mark the 51st meeting of the organization.

The symposium on war medicine will be of vital and direct interest to the health and welfare of the men in the armed forces, to physicians, re-

search specialists and scientists everywhere, as well as to the general public. It is expected that the meeting will bring 2,000 doctors, many of whom have been in active combat with the service men in every camp and base throughout the country and on all the fighting fronts.

The announcement of the plans for the convention of military surgeons was made by Rear Admiral William L. Mann, M.C., of Seattle, Washington, President of the Association of Military Surgeons.

"It is especially appropriate that Philadelphia should furnish the setting for this most important meeting. Philadelphia has long been recognized as the first city of medicine and has made enormous contributions to the advance of medical science. Then, too, it is the birthplace of American freedom, which our military surgeons are now helping our fighting men maintain in this struggle for the survival of democracy throughout the world," Rear Admiral Mann said.

The meeting will be of a magnitude and scope never before known in the history of the organization, according to Rear Admiral Mann. Medical officers of the armed forces who have seen actual duties in the various combat zones will report first hand on the United States medical services under combat in climatic conditions new to American arms.

Medicine's methods of meeting the new and complicating factors brought on by mechanized modern warfare will also highlight the sessions. There will be reports and discussions on such new matters as air evacuation, parachute injuries, the physiological aspects of high altitude flying and dive bombing, tropical medicine, blast injuries, amphibious operations, submarine warfare, immersion and temperature extremes, neurosurgical problems and the whole field of rehabilitation.

The military surgeons meeting will be opened with addresses of welcome by Governor Edward Martin, of Pennsylvania, and Mayor Bernard Samuel of Philadelphia. At the initial evening session, to be known as "Army Night," the President will deliver his greetings to the convention via radio. There will be addresses by the Chinese Ambassador, Wei Tao-Ming, and by Surgeon General Normal T. Kirk, of the United States Navy.

At the following night's session, which will be known as "Navy Night," the principal speaker will be the Hon. Frank Knox, Secretary of the Navy. The presiding officer will be Rear Admiral Ross T. McIntyre, surgeon general of the United States Navy and personal physician to the President.

Nationwide hook-ups will carry reports of the meeting to the public at large and by short-wave broadcast to the people in Allied countries, who will be apprised of the convention and its meaning to the men in arms and national health in general.

The convention, with its score of exhibits and meetings, will occupy all available floor space in the Bellevue-Stratford. The program will list, besides general sessions, a series of forum lectures and teaching panels, as well as a great number of film showings.

American - Soviet Medical Society Chapter Launched in Detroit

The American-Soviet Medical Society, recently organized to stimulate the exchange of medical information between the United States and the Soviet Union, formally launched its Detroit chapter August 18th. Professor Vladimir V. Lobedenko of the Department of Surgery at the First Moscow Medical Institute, who is at present in the United States as official representative of the Russian Red Cross, was the chief speaker. He described his experiences with Soviet war medicine and particularly with new methods of treating shock at the front.

Dr. Warren B. Cooksey, head of the Michigan Blood Bank, presided. The gathering was addressed by Dr. Barris, head of the Detroit chapter of the American Red Cross; Dr. Bruce H. Douglas, commissioner of the Detroit Board of Health; a representative of the Wayne County Medical Society; and the executive secretary of the American-Soviet Medical Society.

Mississippi Valley Medical Society

The ninth annual meeting of the Mississippi Valley Medical Society will be held at Quincy, Illinois, September 29 and 30, 1943.

Some twenty clinician-teachers will present the program, the first day being an All-Chicago program with a stag buffet supper in the evening. The annual banquet, a feature of the meeting, will also be held. The list of speakers includes Brigadier General Fred W. Rankin, Dr. George W. Post, Dr. Warren H. Cole and Dr. Paul B. Magnuson of Chicago, Dr. John de J. Pemberton and Dr. Samuel F. Haines of Rochester, Minnesota, Dr. Willis M. Fowler of the University of Iowa and Dr. Julius Jensen of Washington University.

The program will be practical in nature and will be keyed to wartime medicine. All ethical physicians are invited to attend. A program may be obtained from the secretary, Dr. Harold Swanberg, 209 W. C. U. Building, Quincy, Illinois.

BOOK REVIEWS

HISTORY OF SURGERY. By *Richard A. Leonardo,* M.D., Ch.M., F.I.C.S. Member American Association of the History of Medicine, Fellow Royal Society of Medicine (London); Associate Fellow National Gastroenterological Association; Member American Medical Association of Vienna (Austria); Formerly President American Medical Association of Budapest (Hungary); Fellow American Medical Association; Fellow International College of Surgeons. Cloth. Pp. 504. 100 full page illustrations. Price, $7.50. New York: Froben Press, 1943.

Since Billings' monograph on the history of surgery in 1895 there appeared no large scale history of surgery in English. The author of this volume has worked painstakingly and conscientiously to fill a real need. He culled arduously from the records of the works of the great surgeons of history and has devoted much effort and space to the personalities and features of recent surgical developments, here and abroad. A total of 33 chapters presents in chronologic order Primitive, Babylonian, Egyptian, Hebrew, Hindu, Chinese, Japanese, Greek, Alexandrian, Roman, Byzantine, Arabian, Medieval and Renaissance Surgery; chapters on 17th to 19th Century Surgery and on Barber Surgeons lead to those on American Surgery, on the Listerian Revolution in Surgery and on Anesthesia. The last ten chapters give accounts of recent English, Swiss, Italian, French, German, Austrian and Hungarian Surgery, as well as of Surgery in South America, Mexico and Canada. The fact that the author has traveled extensively and attended many surgical clinics abroad, has been undoubtedly a great help to him in carrying out his ambitious presentation. One hundred full page illustrations of prehistoric and ancient surgery and of title pages of rare surgical books of the middle ages and other surgical classics greatly vivify the volume and an extensive bibliography and good index add to its practical usefulness. Leonardo's well conceived and interestingly presented tome should prove timely and stimulating to all surgeons now, when under war time conditions surgery is again on the rapid forward march the world over.

THE ROAD TO VICTORY. By *Francis J. Spellman,* Archbishop of New York, Military Vicar of the Armed Forces of the United States. Cloth. Pp. 131. Price, $1.75. New York: Charles Scribner's Sons, 1941.

Archbishop Spellman's visits to the men of the Armed Forces around the Mediterranean and to far outposts in Africa commanded much respect for his personal courage and high devotion to our cause of Victory. The present volume, written just before he embarked on his self-sacrificing mission, furnishes more documentation of the inspired leadership and patriotic fervor of this Prince of the Church. He writes: "Every moment, every drop of blood and sweat, every hour of fatiguing labor, every wound of our poor torn humanity, can and must be consecrated to the defense of our country and the cause of charity." Archbishop Spellman probes deeply into the causes of those diseases which infest our civilization. As a true spiritual healer, he proposes total victory not alone on land, in the air and on the sea, but a victory also for America's ideals. The successive chapterheads of the inspired volume are: "Our God-Given Rights," "A World at War," "A Branch in the Tree of Life," "Faith Is the Lost Horizon," "Freedom to Do What Is Right," "A Sacred Trust," "The Law of Love," "The Sword Cannot Breed Peace," "Two Anchors—Patriotism and Religion," "The Two Battles," "The Road to Victory." He expects with grim determination, that the difficulties and problems at home or abroad will be mastered. He strikes out against the moral degeneration and paganism which have reached deeper than anyone believed possible. As to the post-war world he enunciates the principle of a wise leader: "In essential things, unity; in non-essential things, liberty; and in all things, charity." Men in all ranks of life and without regard to race, color or creed should find inspiration in this volume.

FIRST AID. SURGICAL AND MEDICAL. By *Warren H. Cole,* M.D., F.A.C.S., Professor and Head of the Department of Surgery, University of Illinois College of Medicine; Director of Surgical Service, Illinois Research and Educational Hospitals, Chicago; and Lieutenant Colonel *Charles B. Puestow,* Medical Corps, Army of the United States. Illustrations by *Carl Linden* in collaboration with *Tom Jones* of the Illustration Studios of the University of Illinois College of Medicine, Chicago. Second Edition. Cloth. Pp. 347. Price, $3.00. New York and London: D. Appleton-Century Company, 1943.

In the second edition of this popular and well written book the authors have made numerous changes and additions. All the contributors are well known and able to present the chapters which they have prepared. Two new chapters have been added. One of them deals with miscellaneous conditions requiring first aid; most of the subjects are related to problems arising in military personnel. The other chapter is limited to Foot Lesions, particularly those types commonly encountered in military life. Ten new illustrations are included, eight to replace old ones deleted and two entirely new. Percival Bailey

contributed the chapter on injuries of the scalp, skull, spine and nervous system. Major William C. Beck, Medical Corps, Army of the United States writes on abdominal injuries; William H. Cassels, respiratory emergencies; Geza de Takats, injuries to large blood vessels; Paul W. Greeley, burns and frost bite; Fred W. Hark, fractures, dislocations and sprains; medical emergencies is written by Robert W. Keeton; Joseph H. Kiefer, emergencies of the genito-urinary tract; Major Claude N. Lambert, compound fractures. There are many others equally important and interesting. In addition to the concise and clearly written material each illustration is in itself an education because they are so well gotten up that there can be no mistaking the technic that is intended. In the preface to the first edition the authors have stated that the chief purpose of the text is to assemble material of practical value, and they emphasize the fact that first aid personnel must be well trained and above all else should know their own limitations, lest their therapy be damaging to the patient. The authors have rightly called this an advanced guide. It is highly recommended.

SYNOPSIS OF TRAUMATIC INJURIES OF THE FACE AND JAWS. By *Douglas B. Parker*, M.D., D. D. S., Associate Professor, Department of Oral Surgery, School of Dental and Oral Surgery, Columbia University, New York. Cloth. Price, $4.50. Pp. 328, with 226 illustrations. St. Louis: The C. V. Mosby Company, 1943.

Automotive and industrial accidents and at present military casualties are the chief causes of the increasing frequency of maxillofacial injuries. So far there has been no concise volume in existence adequately dealing with the many phases of these important injuries and the author, fully qualified by long experience has set out to fill this need. Dr. Parker has had first hand experience in the treatment of face and jaw injuries during the first world war and nearly thirty years of hospital and teaching experience in the field of maxillofacial surgery. With the aid of 229 illustrations he has covered his subject clearly and fully. The successive chapter headings are incidence of face and jaw injuries, applied anatomy of the face and jaws, initial treatment of injuries at scene of accident, shock, control of infection, wounds of soft tissue, treatment of wounds, burns of the face, bony injuries, stabilization of fractures, complications, surgical reconstruction, surgical prosthetic restorations, casts and moulages, anesthesia, roentgenographic technic of mandible and maxillae, bandaging, feeding and diet, transportation and medicolegal aspect of traumatic injuries of the face and jaws. This should be a volume specially welcomed by dentists and physicians entering military service without specialized training.

THESE MYSTERIOUS RAYS. By *Alan L. Hart*, M.D., M.Sc. (Med.). Cloth. Pp. 214, illustrated. Price, $2.75. New York and London: Harper & Brothers, 1943.

This book, which is "a nontechnical discussion of the uses of x-rays and radium, chiefly in medicine," was written for the layman. The auther uses simple, nonmedical terminology and often resorts to dialogue between, for example, physician and technician. The result is a volume that can be quickly read and easily understood by any reader. The first chapter deals with a typical day in a roentgenologic laboratory. A reader will derive from this some idea of the breadth of work done by roentgenologists. For in this one day, this particular laboratory might have seen patients suffering from mastoiditis, disease of the gallbladder, fractures, abscessed teeth and pylorospasm, to mention a few cases. In a subsequent chapter entitled "Radiology Comes of Age," a brief history of the science of roentgenology is given. Following this, the author has devoted a chapter to each particular field in which roentgenology is valuable. For instance, one is called "The Roentgenologist Studies Bones," another is "The Roentgenologist Studies Lungs," and others deal with the roentgenologist studying the head, the urinary system and the digestive system. The author discusses the importance of roentgenology in obstetrics and devotes considerable space to roentgenology and cancer. As simply as possible, the processes of roentgen therapy, radium therapy and ultraviolet therapy are explained. The potential dangers involved in such therapy, to patient, physician and technician are set forth. It is noteworthy that the author stresses the contribution of the roentgenologist in diagnosis and treatment. He points out that most patients never realize that it was the roentgenologist who actually made the diagnosis rather than the surgeon or internist. It is doubtful whether physicians will find anything new or startling in this book. However, it can be highly recommended to the lay public, for it will answer many questions in this field in a way that will both interest and satisfy them.

PHYSICAL THERAPY ABSTRACTS

Cutaneous Melanomas. A Clinical Study of Sixty Cases. J. R. Driver, and Donald N. MacVicar.
J. A. M. A. **121**:417 (Feb. 6) 1943.

This report is based on a clinical study of 60 cases.

The authors' practice has been to remove pigmented junction type nevi for prophylactic and diagnostic purposes, if located on areas subjected to chronic irritation. This has been done by scalpel excision, with a margin of approximately one-half inch of healthy tissue, including the subcutaneous tissues. In some instances thorough destruction by the electrocautery or electrodesiccation has been employed. Recurrences or dissemination of quiescent pigmented nevi have not been seen by us following these methods.

In the authors' opinion, these lesions should not be treated by irradiation, by the application of caustics or solid carbon dioxide by electrolysis or by any method requiring repeated treatments. Experienced clinical judgment is of the utmost importance.

In the period of twenty years covered by this report, various treatment methods have been employed. For the primary lesions, these have included electrothermic destructive procedures, scalpel excision and amputation in some cases in which the lesions were on the extremities. Irradiation, with roentgen rays and radium, was applied to the operative field in some instances. Irradiation of metastatic involvement of the nodes failed to prevent further dissemination and death in every instance in which it was used including those in which surgical dissection was also done.

As a rule, dissection of lymph nodes was not performed unless there was clinical evidence of their involvement. Criticism of this procedure may be justified, but we would like to point out that in the practice of the dermatologist a larger proportion of the lesions are earlier types of melanomas than those seen by the surgeon or radiologist.

Of the other group of 35 patients seen in dermatologic practice 17, or 48.6 per cent, survived from seven to eighteen years. As a group these patients were seen comparatively early in their disease and the great majority were free of metastatic dissemination when they were first treated.

Of a series of 60 patients with melanomas, a group of 25 patients seen in hospital surgical practice presented themselves for treatment, comparatively late, with relatively advanced malignant growths and a large percentage showing metastatic involvement. Only 2 patients are known to be alive more than five years later. The mortality rate was 92 per cent.

The results obtained indicate that the only hope of reducing the high mortality rate in cutaneous melanoma lies in early diagnosis and thorough destruction of the primary lesion before dissemination takes place, either by electrocauterization (not electrolysis) or by radical scalpel excision.

Blood Flow in Extremities Affected by Anterior Poliomyelitis. David I. Abramson; Kamillo Flachs; Joseph Freiberg, and I. Arthur Mirsky.
Arch. Int. Med. **71**:391 (March) 1943.

The rate of blood flow during rest was measured by the venous occlusion plethysmographic method in a series of 27 subjects with acute or chronic anterior poliomyelitis of one extremity.

It was found that in the majority of cases the peripheral circulation in the paralyzed limb was the same as that in the contralateral normal extremity; in fact, in some instances it was even significantly greater.

Evidence was obtained which indicated that the cutaneous blood vessels in the extremity affected by anterior poliomyelitis respond more markedly to the stimulus of cold than do those of the contralateral normal limb. The response takes the form of excessive vasoconstriction on exposure to a low environmental temperature and is apparent as a significant decrease in cutaneous temperature.

By studying the changes in blood flow during the reactive hyperemia elicited by a period of arterial occlusion, some evidence was obtained which suggested that the metabolism of muscles atrophied by poliomyelitis is the same as that of normal tissues.

In view of the lack of evidence for the hypothesis that in persons with anterior poliomyelitis the peripheral circulation is reduced, it is concluded that those treatments which have for an aim the increase in blood flow through the affected parts should be critically reexamined for their therapeutic value.

A Review of the Drastic Shock Therapies of the Psychoses. Franklin G. Ebaugh.
Ann. Int. Med. **18**:279 (March) 1943.

The author has presented the present day methods and therapeutic application of the drastic therapies of the psychoses by the use of pharmacologic shock therapy, such as insulin and metrazol and electric convulsive therapy. The mode of action of these therapies continues unknown although there have been many theories regarding their beneficial therapeutic effect. These therapies serve to supplement other therapeutic methods. Insulin shock therapy may make schizophrenic patients more accessible to psychotherapy. Metrazol is now being discarded by many clinics for electric convulsive therapy which is

simpler and perhaps less drastic and hard on the patient and because, when combined with curare, the complication of fractures is eliminated. Both metrazol and electric convulsive therapy have proved to be of little benefit in the treatment of schizophrenic reactions but of considerable benefit in the treatment of the affective disorders, especially the depressive reactions. These drastic therapies were inaugurated with uncontrolled enthusiasm and, as has been true historically in other types of therapy, have probably been made to appear more promising than is actually the case. On the other hand they have aroused tremendous interest in mental hospitals and have emphasized the importance of treatment of serious psychotic reactions, with the resultant changes in the attitude of the personnel of these institutions as well as patients and their relatives and the general public. They have presented numerous problems for research of physiologic, psychologic, biochemical and histopathologic import and have increased further the necessary collaboration between the use of internal medicine and psychiatry.

Better controls, greater uniformity, a better balanced psychotherapy with shock therapy and better follow-up studies based on complete social, physical and psychologic examinations must be made.

Peyronie's Disease (Plastic Induration), Cause and Treatment. Miley B. Wesson.

J. Urol. **49**:350 (March) 1943.

Whenever a variety of treatments are recommended for any disease, it is known that none are specific and that the symptoms are merely being treated while waiting for Nature to bring about a cessation of advancement, if not a regression.

The treatment is wholly empiric, and is the use of (1) roentgen ray, (2) radium, (3) fibrolysin, (4) diathermy, (5) massage, (6) internal medication and (7) surgery.

The non-venereal prostatitis of the youth and the plastic induration of later life are both due to the same violation of Nature's sex laws.

A prolonged virulent inflammation of the urethra may result in Peyronie's disease.

Peyronie's disease may be fundamentally due to (1) heredity, (2) degenerative disease of middle or late life, (3) fibroplastic diathesis or (4) trauma.

"Internal trauma" from prolonged ungratified sexual desires or external trauma from lack of proper sexual cooperation are the direct causes.

The approaching menopause with the concomitant frigidity of the consort is probably indirectly the principal cause of plastic induration.

In early cases before the deposit of lime salts, diathermy, fortified by disodium phosphate per os, may not be a specific, but it is inexpensive, harmless, and keeps up the patient's morale.

Without treatment the lesion may regress, but it is found that it usually advances and ultimately invades the corpora cavernosa.

Effect of Infra-red Heat on Localized Poliomyelitis and Neuritis. John A. Toomey.

J. Pediat. **22**:135 (Feb.) 1943.

It has long been contended that since poliomyelitis is not in the muscle but in the nerve, every effort should be directed toward keeping the muscle in good condition, so that the nerve can have something to move when its function returns. This is best accomplished by some form of heat. The author uses infra-red therapy, which causes capillary dilatation. Perhaps there is an increase in blood flow and, as a result, an increase in metabolic activity of the muscles. This might be accomplished by other means, such as by Kenny's hot foments, but the physiologic effect would be the same. That heat alone may be efficient therapy might be concluded by the results obtained in these nine cases, three of poliomyelitis and six of peripheral neuropathy (neuritis).

Despite apparent complete lack of movement in the three patients with infantile paralysis, these patients must have had some fibers left connecting the muscles with the nucleus of the seventh nerve, since these muscles could be moved voluntarily after treatment. No movement would have been obtained had all the cells of the nucleus nerve been destroyed.

It seems obvious that with the method of passive massage, galvanic stimulation and infra-red heat, the patients responded and went on to a quick clinical cure.

One would like to believe that results obtained after the application of infra-red rays could be used as a point of differential diagnosis between poliomyelitis and peripheral neuropathy (neuritis). There are so many patients, however, who have partial involvements with paresis and not paralysis that such a test could not become a standard of differentiation; yet, with the facts in mind, one could get some idea of prognosis in varying conditions.

If the patient has a peripheral neuropathy, the prognosis is the prognosis of the whole patient. If he starts to recover generally, he will recover locally, and the recovery will be complete. The author tells of twelve such patients with facial involvements out of a total of seventy-four and all had recovered movement.

If the patient has obvious signs of poliomyelitis, including involvement of the facial nerves and after three weeks following the disappearance of edema (which in itself may cause paralysis) there is no response after the application of heat, the prognosis becomes extremely guarded as to the return of function of the nerves and hence muscles.

If a patient with complete paralysis who has been diagnosed as poliomyelitis is still completely paralyzed long after edema ordinarily would have subsided, i. e., about three to four weeks, if a few months later, the patient gets a complete return of function of the involved muscles, the diagnosis of poliomyelitis becomes questionable and that of neuritis most probable.

The principle of applied heat in the early stages of poliomyelitis is not new. Osler recommended it years ago and where possible, it has been used at the Cleveland City Hospital for the past twenty years in the treatment of muscles supplied by involved nerves.

Bone and Joint Injuries. R. Watson-Jones.

Lancet **1**:172 (Feb. 6) 1943.

"This is the greatest error in the treatment of sickness, that there are physicians for the body and physicians for the soul, and yet the two are one and indivisible."

The principle of rehabilitation was thus enunciated 2,000 years ago by Plato. Rehabilitation is not the specialty of physical therapists, electrotherapists or occupational therapists; it is not the specialty of physical training instructors or medical gymnasts; still less is it the specialty of a newly created body of experts which will surely arise if the Royal Colleges misguidedly accept the recent Tomlinson recommendation and institute diplomas in rehabilitation. It is true that masseuses, occupational therapists and physical training instructors as well as physicians, specialists and surgeons must be trained. But they must be trained to treat the whole disability and not just part of it. Take, for example, the application of rehabilitation to the treatment of bone and joint injuries, which the author has been advocating for nearly ten years through the deliberations of British Medical Association, Trades Union Congress, British Orthopaedic Association and many other fracture and rehabilitation committees. They were content to treat the fracture and expected the patient in his ignorance to treat the wasted muscle and stiff joint, though he had no medical training to discriminate between the pain of a stretching adhesion which called for exercise and the pain of an unexpected complication which called for rest; a patient who had broken his leg was discharged from hospital as "cured" when no one had any idea whether he could run, whether he had learned to jump, or whether he could climb stairs. It is astonishing that so little attempt was made to explain to a patient the nature of his disability and to relieve his natural fears and misgivings. Physical treatment was but half completed; psychologic treatment was wholly neglected. And when a patient drew the apparently obvious conclusion that there was a residual and permanent disability and turned to the only refuge he knew—the refuge of litigation and lump sum settlement—he was blamed and was called a malingerer. Malingerers are made, not born. Malingering is a complication of fracture treatment no less certainly under the control of the surgeon than mal-union and non-union. But though a part of the technic of rehabilitation is to teach the patient to walk, run and jump and to arrange for active exercise, graduated stresses, occupational activities, games and recreations the principle is more profound. John Buchan put it in these words: "It is not enough to have specialists for psychologic diseases and specialists for physical diseases; the same man must in a sense be both. A good physician should be something of a psychologist." A good nurse, a good masseuse, a good medical gymnast is also something of a psychologist; the whole team is trained in rehabilitation. We must not perpetuate the 2,000-year-old error—we must not separate rehabilitation from medicine and surgery. Above all we must not train "rehabilitationists." When the surgeon himself, with the aid of every member of his team, gives the patient confidence, explains his problems, anticipates his fears, reassures his mind, and completes his treatment, then he becomes a physician of the body and the soul. He leaves the ranks of "physicians doomed to the practice of surgery"; he joins the ranks of surgeons dedicated to the practice of medicine of the soul.

Planning for the Treatment of Head Injuries. Hugh Cairns.

Brit. M. J. **4288**:313 (March 13) 1943.

It would be harmful if people came to think that rehabilitation consisted of physical therapy or some other technical method of treatment, or that it was the particular province of any group of specialists. To set up a specialty of rehabilitation would be akin to establishing specialties for diagnosis or for therapy. In a national scheme all varieties of medical specialist would be involved and the general practitioner and the industrial physician would be more essential than any. The entire medical profession would be involved. In ancillary services the social worker would be at least as important as the masseur.

Extension of rehabilitation to all sick and injured persons would obviously require a large increase of social workers and physicians, whose training would tend to become standardized. But in each group of diseases or injuries successful rehabilitation depends to some extent on special knowledge of the disabilities produced by the disease or injury in question and of the reactions of patients to these disabilities. Trained experts would deal with the cases requiring institutional after-care, mostly in special centers, from which advances in knowledge of the social aspects of ill-health might be expected. But, if the experiences with head injuries are any guide, it would seem that much of the after-care of the nation's sick and injured should continue to be directed by the physician who treats the patient in the acute stage of his illness. If in his student days he can be taught the after-care of patients in a practical way and if he can be supplied with more precise knowledge of the social prognosis of diseases and with adequate assistance from social services and from employers, this task should not be beyond him.

SCHOOLS APPROVED FOR TRAINING PHYSICAL THERAPY TECHNICIANS

By the Council on Medical Education and Hospitals of the American Medical Association *

Name and Location of School	Medical Director	Emergency Course					Regular Course			
		Entrance Requirements †	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma	Length in Months	Classes Start	Tuition	Certificate, Degree, Diploma
Children's Hospital, Los Angeles[1]	Steele F. Stewart, M.D.	a-b-c	6	FebAug	$200	Certificate	12	FebAug	$200	Diploma
College of Medical Evangelists, Los Angeles[1]	Fred B. Moor, M.D.	a-b-c	....	.....	.....	.....	12	JanJuly	$200	Certificate
University of California Hospital, San Francisco[1]	Frances Baker, M.D.	a-b-c	....	.....	.....	.....	12	Feb	$150	Certificate
Stanford University, Stanford University, Calif.[1]	Wm. H. Northway, M.D.	a-b-d[2]	7	Quart.	$286	Certificate	10	Quart.	$401	Cert. or Degree
Walter Reed General Hospital, Washington, D. C.	Capt. D. L. Rose, MC.	b	6	Quart.	None	Certificate	....	.....	.....	.....
Northwestern University Medical School, Chicago	John S. Coulter, M.D.	a-b-d	....	.....	.....	.....	9	JulyOct	$200	Certificate
State University of Iowa Medical School, Iowa City	W. D. Paul, M.D.	b-c	6	MarSept	None	Certificate	....	.....	.....	.....
Bouve-Boston School of Physical Education, Boston	Arthur L. Watkins, M.D.	HS	....Given in conjunction with Harvard				3-4 yrs.	Sept	$400 yr.	Dipl. or Degree
Harvard Medical School, Boston	Frank R. Ober, M.D.	a-b-c	6	June	$200	Certificate	9	June	$250	Certificate
Boston University Sargent College of Physical Education, Cambridge, Mass.	Louis Howard, M.D.	a-b-c	....	.....	.....	.....	24	JanOct	$435 yr.	Cert. & Degree
University of Minnesota, Minneapolis[1]	Miland E. Knapp, M.D.	a-b-c[3]	....	.....	.....	.....	12	Summer	$112[4]	Certificate
Mayo Clinic, Rochester, Minn.[1]	Frank H. Krusen, M.D.	a-b-c	6	Jan-July	None	Certificate	9	JanJuly	None	Certificate
Barnes Hospital, St. Louis	Frank H. Ewerhardt, M.D.	a-b-c	....	.....	.....	.....	9	Oct	$200	Certificate
St. Louis University School of Nursing, St. Louis[1]	Alexander J. Kotkis, M.D.	HS	....	.....	.....	.....	4 yrs.	JanSept	$250 yr.	Cert. or Degree
University of Buffalo School of Nursing, Buffalo[1]	George G. Martin, M.D.	a-b-c	6	FebSept	$420	Certificate	1-3 yrs.	FebSept	$350	Cert. or Degree
Hospital for Special Surgery, New York City[1]	Kristian G. Hansson, M.D.	a-b-c	....	.....	.....	.....	9	Sept	$300	Diploma
New York University, New York City[1]	William Bierman, M.D.	a-b-c	....	.....	.....	.....	9	FebSept	$396	Cert. & Degree
Cleveland Clinic Foundation Hospital, Cleveland	Walter J. Zeiter, M.D.	a-b-c	....	.....	.....	.....	9	Sept	None	Certificate
D. T. Watson School of Physiotherapy, Leetsdale, Pa.[1]	Jessie Wright, M.D.	a-b-c	....	.....	.....	.....	12	July	$200	Diploma
Graduate Hosp. of the Univ. of Pa., Philadelphia[1]	Wm. T. Johnson, M.D.	a-b-c	....	.....	.....	.....	12	Sept	$200	Certificate
Richmond Professional Institute, Richmond, Va.	T. W. Wheeldon, M.D.	a-d[5]	....	.....	.....	.....	9-12	Sept	$200-220	Certificate
University of Wisconsin Medical School, Madison[1]	Ernest A. Pohle, M.D.	a-b	6	FebSept	$96[4]	Certificate	12	Sept	$96[4]	Certificate

Note: Details will appear at a later date on the following approved courses:
State University of Iowa, Medical School, regular nine-month course. The following six-month emergency courses (approval extended for duration of the present emergency): Army and Navy General Hospital, Hot Springs National Park, Ark. Fitzsimons General Hospital, Denver. O'Reilly General Hospital, Springfield, Mo. Brooke General Hospital, San Antonio, Texas.

† Courses are so arranged that any of the entrance requirements will qualify students for training. a. = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; HS = High school graduation.

1. Male students are admitted.
2. High school graduates accepted for a four-year course leading to A.B. degree; students admitted quarterly and tuition is $143 per quarter.
3. Medical technology graduate with B.S. degree also admitted.
4. Nonresidents charged additional fee.
5. Those with degree from other colleges also accepted.

* Reprinted with permission.

D. T. Watson
School of Physical Therapy

affiliated with

University of Pittsburgh
School of Medicine

Course in
Physical Therapy

For information address

Jessie Wright, M. D.
Sunny Hill, Leetsdale, Pennsylvania

Course of

PHYSICAL THERAPY

HOSPITAL FOR SPECIAL SURGERY
321 East 42nd Street
New York City

Dir.: K. G. Hansson, M.D.

COPIES OF THE REGISTRY DIRECTORY may be obtained for 10c to cover cost of mailing. Stamps will be accepted. Write to

AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS,
30 North Michigan Avenue,
Chicago.

OFFICIAL INSIGNIA

THE AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS

The PIN
(About Actual Size)

The official pin is made of 1/10 carat gold with purple enamel trim.

$3.85
(Including Federal Tax)

The EMBLEM
(Two-thirds Size)

Gold and purple on white cloth. Color fast. Each,

15c

The pin or the emblem may be obtained with "S" or "J". Cost must accompany order. (Prices subject to change without notice.)

Address all communications to
AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS
30 N. Michigan Ave. Chicago

I. GREENWALD CO., INC.

Manufacturers of complete line of Electro-Medical and Surgical Instruments and Accessories. Repair of all instruments.

Catalog on request.

2688 DeKalb Street GARY, INDIANA

MEETINGS OF PHYSICAL THERAPY ORGANIZATIONS

In these columns will be published information about meetings, election of officers, etc., of physical therapy organizations. New data should be sent promptly to the office of the Secretary, 2 E. 88th St., New York.

New York Physical Therapy Society; meetings on first Wednesdays, from October to May, New York City; Dr. Madge C. L. McGuinness, 1211 Madison Avenue, New York, Secretary.

Connecticut Physical Therapy Society, meetings held in May and October at same time as the Connecticut State Medical Society. Dr. Karl Bretzfelder, 315 Whitney Avenue, New Haven, Conn., Secretary-Treasurer.

Southeastern and Southern Sections, American Congress of Physical Therapy will meet in conjunction with the *Section on Physical Therapy* of the *Southern Medical Association,* Cincinnati, Ohio, November 16, 17 and 18, 1943. Dr. E. J. C. Hildenbrand, 4201 Fessenden St., N. W., Washington, D. C., Chairman.

Kings County Medical Society, Physical Therapy Section; meetings at 1313 Bedford Avenue, Brooklyn, bi-monthly on second Thursdays; Dr. Samuel A. Warshaw, 1373 Ocean Parkway, Brooklyn, N. Y., Secretary.

The Penna. Academy of Physical Medicine; meetings at the Phila. County Medical Building, 21st and Spruce Streets, third Thursday, alternate months, starting with January; Dr. Harold Lefkoe, 5217 North Broadway, Philadelphia, Secretary-Treasurer.

NO OTHER MEDICAL PERIODICAL GIVES YOU SUCH "WIDE COVERAGE" IN THE PHYSICAL THERAPY FIELD AS *THE ARCHIVES*

If you are a teacher in physical therapy, a research worker, a physicist, or just a clinician — if you want to stay abreast of all that is new in physical therapy— you must read THE ARCHIVES.

Each month you will find in this journal informative articles, constructive editorials, news on science and a wealth of abstracted material dealing with every phase of physical medicine.

If you are not a subscriber to THE ARCHIVES — send in your subscription today. Sample copy will be sent on request. Subscription price $5 per year; Foreign $6.50.

AMERICAN CONGRESS OF PHYSICAL THERAPY, 30 No. Michigan Ave., Chicago.

Please find enclosed check for $5 ☐ or bill me ☐ for one year's subscription to the ARCHIVES.

Name.....

Address.....

City and State.....

PARTIAL LIST of PAPERS SUBMITTED for PUBLICATION in *ARCHIVES* DURING 1943-1944

Fever and Sulfadiazine Therapy in Resistant Gonorrhea. **Sidney Licht, Capt., M.C.,** Chief, Physical Therapy Section, Lovell General Hospital, Fort Devens, Mass., and **Vernon S. Dick, Capt., M.C.,** Chief, Urology Section, Lovell General Hospital, Fort Devens, Mass.

The Reduction of Man Power Loss from Gonorrheal Urethritis by the Early Application of Chemo-Fever Therapy. **Lt. Comdr. Kenneth Phillips (M.C.), U. S. N. R.,** and **Ensign Alice B. Mundorff (N.C.), U. S. N. R.**

Renal Complications in Combined Sulfathiazol-Fever Therapy. **Arthur Pruce, 1st Lt., M.C.,** Chief, Physical Therapy Section, Stark General Hospital, Charleston, N. C.

Radiant Disinfection: Part II. Practice. **William Firth Wells,** Associate Professor in Research in Air-borne Infection, Laboratories for the Study of Air-borne Infection, The School of Medicine, University of Pennsylvania, Philadelphia.

Refrigeration. **Robert Talbot McElvenny, M.D.,** Associate Surgeon, Northwestern University Medical School; Attending Orthopedic Surgeon, Wesley Memorial Hospital, Chicago.

Cold Allergy. **Bayard T. Horton, M.D.,** Head of Section of Clinical Investigation, The Mayo Clinic; Associate Professor of Medicine, The Mayo Foundation, University of Minnesota, Rochester, Minnesota.

Modern Hydrotherapy. II. A Review of Recent Developments. **Hans J. Behrend, M.D.,** Lecturer, Physical Therapy, School of Education, New York University; Associate, Physical Therapy, Hospital for Joint Diseases, New York, N. Y.

Rehabilitation of Arthrogryposis Multiplexa Congenita. **Carl Egbent Badgley, M.D.,** Professor of Surgery in Charge of Orthopedic Surgery, University of Michigan Medical School, Ann Arbor, Michigan.

Management and Care of Infantile Paralysis Patients. **Edward Lyon Compere, M.D.,** Associate Professor, Northwestern University Medical School; Attending Orthaepedic Surgeon and Chairman of the Department of Orthopaedic Surgery, Wesley Memorial Hospital, Chicago.

The Interpretation and Clinical Significance of Calorimetric and Skin Temperature Measurements of the Extremities. **Charles Sheard, Ph.D.,** Professor of Biophysics, Mayo Foundation, University of Minnesota and Director of Division of Physics and Biophysical Research, The Mayo Clinic, Rochester, Minn.; **Grace M. Roth, Ph.D.,** Instructor in Physiology, Mayo Foundation, University of Minnesota and Associate in Clinical Physiology, The Mayo Clinic, Rochester, Minn., and **Edgar V. Allen, M.D.,** Associate Professor of Medicine, Mayo Foundation, University of Minnesota and Head of Section of Medicine, The Mayo Clinic, Rochester, Minn.

Rehabilitation, Prehabilitation and Placing the Recovered Workman. **Madge C. L. McGuinness, M.D.,** Director, Department of Physical Therapy, Lenox Hill and Miscericordia Hospitals, New York, N. Y.

Rehabilitation — Opportunities for Psychotherapy in Physical Therapy. **Alfred P. Solomon, M.D.,** Associate Professor, Psychiatry, University of Illinois College of Medicine; Senior Attending Neuropsychiatrist, St. Luke's Hospital, Chicago.